...gin
...01
...42
...R1
...1-4
...983
...01-14060

...ME 21 / NUMBER 1
...ARY 8, 1983
NOS. N83-10001 TO N83-11017

STAR

AN ABSTRACT JOURNAL

Scientific and Technical Aerospace Reports

...OF TECHNOLOGY
...OF GEOLOGY
MAR 1 9 1983
...KEERING
...LIBRARY

PRODUCED BY THE
SCIENTIFIC AND TECHNICAL
INFORMATION
BRANCH

NASA

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WHAT YOU CAN DO FOR *STAR*

All users of this abstract service are urged to forward reports to be considered for announcement in *STAR*. This will aid NASA in its efforts to provide the fullest possible coverage of all scientific and technical publications that might support aeronautics and space research and development. If you have prepared relevant reports (other than those that you will transmit to NASA, DoD, or DOE through the usual contract- or grant-reporting channels), please send them for consideration to the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

Reprints of journal articles, book chapters, and conference papers are also welcome. These will be considered for announcement in *STAR's* companion journal, *International Aerospace Abstracts*.

You may specify a particular source to be included in a report announcement if you wish; otherwise the report will be placed on public sale at the National Technical Information Service. Copyrighted publications will be announced but not distributed or sold.

PURCHASE OF *STAR*

The semimonthly issues are available postpaid on subscription and in single copy from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, United States of America.

Semimonthly issues...

Annual subscription rates: $90.00 domestic; $112.00 foreign. Price per single copy: $4.75 domestic; $5.95 foreign.

Annual index issues...

Pricing based upon pagination.

Domestic subscription rates...

Apply to the United States, Canada, Mexico, and all Central and South American countries, except as noted below.

Foreign subscription rates...

Apply to Argentina, Brazil, French Guiana, Guyana, Surinam, Belize, and all other countries throughout the world.

Payment should be by check, money order, or document coupons, and must accompany order. Remittances from foreign countries should be made by international money order or draft on an American bank, payable to the Superintendent of Documents, or by UNESCO book coupons.

PUBLISHED BY:

UNITED STATES GOVERNMENT
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
SCIENTIFIC AND TECHNICAL INFORMATION BRANCH
Scientific and Technical Aerospace Reports, Volume 21, is prepared by the NASA Scientific and Technical Information Facility operated for the National Aeronautics and Space Administration by PRC Government Information Systems.

The Administrator of the National Aeronautics and Space Administration has determined that the publication of this periodical is necessary in the transaction of the public business required by law of this Agency. Use of funds for printing this periodical has been approved by the Director of the Office of Management and Budget through February 28, 1985.

US ISSN 0036-8741

THE UNIVERSITY OF MICHIGAN
MAR 10 1983
ENGINEERING LIBRARY

INTRODUCTION

Scientific and Technical Aerospace Reports (STAR) is a major component of a comprehensive National Aeronautics and Space Administration information system covering aeronautics, space, and supporting disciplines. *STAR* is issued on the 8th and 23rd of each month and announces current publications of the following types:

- NASA, NASA contractor, and NASA grantee reports
- Reports issued by other U.S. Government agencies, domestic and foreign institutions, universities, and private firms
- Translations in report form
- NASA-owned patents and patent applications
- Dissertations and theses

Cumulative index volumes are published annually.

Journal, book, and conference literature, cover-to-cover journal translations, and certain foreign dissertations are announced in a companion journal, *International Aerospace Abstracts (IAA)*, available on subscription from the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

SUBJECT SCOPE

Subject scope of *STAR*, and *IAA* includes all aspects of aeronautics and space research and development, supporting basic and applied research, and applications. Aerospace aspects of earth resources, energy development, conservation, oceanography, environmental protection, urban transportation, and other topics of high national priority are also covered.

OTHER NASA PUBLICATIONS

Other NASA publications and information services are described in the publication, *The NASA Scientific and Technical Information System ... and How to Use It*, available without charge from the NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Maryland 21240.

10 84 252AA5 2 013 1 SN 1 2552

HOW TO USE *STAR* SUBJECT CATEGORIES

STAR is categorized by 10 major subject divisions divided into 74 specific subject categories and one general category/division. The major subject divisions are listed in the Table of Contents, together with a note for each that defines its scope and provides any cross-references. For example:

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

Each major division is further divided into as many as nine specific categories, which are identified by category numbers.

Abstracts in *STAR* are grouped by specific category, the categories appearing in sequential order. Category breaks in the abstract section are identified by the category number and title, and a scope note. Cross-references to other categories are provided as appropriate. For example:

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*.

CROSS-REFERENCES

Individual *STAR* abstracts are not ordinarily cross-referenced, except for certain conference reports or book translations that have had separate abstracts written for their component papers or chapters. Citations and abstracts of the components follow immediately after those of the parent document. When the subject content of a component differs sufficiently from the general content of the parent, a cross-reference citation also is printed at the end of the category to which it normally would have been assigned if it were independent.

DOCUMENTS ON MICROFICHE

Documents on microfiche(1) are designated by a pound sign (#) following the accession number. The pound sign is used without regard to the source or quality of the microfiche.

AVAILABILITIES

One or more sources from which a document announced in *STAR* is available to the public is given in each citation. The most commonly indicated sources and their acronyms or abbreviations are listed below. If the publication is available from a source other than those listed, the publisher and his address will be displayed on the availability line or in combination with the corporate source line.

(1) A microfiche is a transparent sheet of film, 105 by 148 mm in size, containing as many as 60 to 98 pages of information reduced to micro images (not to exceed 26:1 reduction).

Avail: NTIS. Sold by the National Technical Information Service. Prices for hard copy (HC) and microfiche (MF) are indicated by a price code following the letters HC or MF in the *STAR* citation. Current values for the price codes are given in the tables on page vii.

Initially distributed microfiche under the NTIS SRIM (Selected Research in Microfiche) is available at greatly reduced unit prices. For this service and for information concerning subscription to NASA printed reports, consult the NTIS Subscription Section, Springfield, Va. 22161.

NOTE ON ORDERING DOCUMENTS: When ordering NASA publications (those followed by the * symbol), use the N accession number. NASA patent applications (only the specifications are offered) should be ordered by the US-Patent-Appl-SN number. Non-NASA publications (no asterisk) should be ordered by the AD, PB, or other *report* number shown on the last line of the citation, not by the N accession number. It is also advisable to cite the title and other bibliographic identification.

Avail: SOD (or GPO). Sold by the Superintendent of Documents, U.S. Government Printing Office, in hard copy. The current price and order number are given following the availability line. (NTIS will fill microfiche requests, as indicated above, for those documents identified by a # symbol.)

Avail: NASA Public Document Rooms. Documents so indicated may be examined at or purchased from the National Aeronautics and Space Adminstration, Public Documents Room (Room 126), 600 Independence Ave., S.W., Washington, D.C. 20546, or public document rooms located at each of the NASA research centers, the NASA Space Technology Laboratories, and the NASA Pasadena Office at the Jet Propulsion Laboratory.

Avail: DOE Depository Libraries. Organizations in U.S. cities and abroad that maintain collections of Department of Energy reports, usually in microfiche form, are listed in *Energy Research Abstracts*. Services available from the DOE and its depositories are described in a booklet, *DOE Technical Information Center - Its' Functions and Services* (TID-4660), which may be obtained without charge from the DOE Technical Information Center.

Avail: Univ. Microfilms. Documents so indicated are dissertations selected from *Dissertation Abstracts* and are sold by University Microfilms as xerographic copy (HC) and microfilm. All requests should cite the author and the Order Number as they appear in the citation.

Avail: USGS. Originals of many reports from the U.S. Geological Survey, which may contain color illustrations, or otherwise may not have the quality of illustrations preserved in the microfiche or facsimile reproduction, may be examined by the public at the libraries of the USGS field offices whose addresses are listed in this Introduction. The libraries may be queried concerning the availability of specific documents and the possible utilization of local copying services, such as color reproduction.

Avail: HMSO. Publications of Her Majesty's Stationery Office are sold in the U.S. by Pendragon House, Inc. (PHI), Redwood City, California. The U.S. price (including a service and mailing charge) is given, or a conversion table may be obtained from PHI.

Avail: BLL (formerly NLL): British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. Photocopies available from this organization at the price shown. (If none is given, inquiry should be addressed to the BLL.)

Avail: Fachinformationszentrum, Karlsruhe. Sold by the Fachinformationszentrum Energie, Physik, Mathematik GMBH, Eggenstein Leopoldshafen, Federal Republic of Germany, at the price shown in deutschmarks (DM).

Avail: Issuing Activity, or Corporate Author, or no indication of availability. Inquiries as to the availability of these documents should be addressed to the organization shown in the citation as the corporate author of the document.

Avail: U.S. Patent and Trademark Office. Sold by Commissioner of Patents and Trademarks, U.S. Patent and Trademark Office, at the standard price of 50 cents each, postage free. (See discussion of patents and patent applications below.)

NASA PATENTS AND PATENT APPLICATIONS

Patents and patent applications owned by NASA are announced in *STAR* under appropriate subject categories and are referenced in the *STAR* indexes. In the Report/Accession Number Index, patents are indexed by the NASA Case Number (which appears in lieu of the report number in other indexes), the U.S. Patent Number, the U.S. Patent Application Serial Number, and the U.S. Patent Class. Patent applications for which patents have not yet been issued are indexed by the NASA Case Number and the U.S. Patent Application Serial Number.

NASA *patent application specifications* are sold in paper copy by the National Technical Information Service at price code A02 ($7.00 domestic; $14.00 foreign). Microfiche are sold at price code A01 ($4.50 domestic; $9.00 foreign). The US-Patent-Appl-SN- number should be used in ordering either paper copy or microfiche from NTIS. Printed copies of *patents* (which are not microfiched) are available for purchase at 50 cents per copy from:

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

When ordering patents, the U.S. Patent Number should be used, and payment must be remitted in advance, preferably by money order or check payable to the Commissioner of Patents and Trademarks. Prepaid purchase coupons for ordering are also available from the Patent and Trademark Office. The patents and patent applications announced in *STAR* are owned by NASA and are available for royalty-free licensing. Requests for licensing terms and further information should be addressed to:

Assistant General Counsel for Patent Matters/Code GP-1
National Aeronautics and Space Administration
Washington, D.C. 20546

ELIGIBILITY AND REGISTRATION FOR NASA INFORMATION PRODUCTS AND SERVICES

A variety of services, in addition to the distribution of NASA scientific and technical reports and of *STAR* and its cumulative indexes, is available to organizations of the following types that have registered with NASA to receive specific services or products:

1. NASA offices, research centers, contractors, subcontractors, grantees, and consultants;
2. Other U.S. Government agencies and their contractors;
3. Libraries in the United States that have arrangements with NASA to maintain collections of NASA documents for public reference;
4. Other organizations in the United States having a need for NASA documents in work related to aeronautics and space research;
5. Organizations abroad that have established reciprocal document exchange arrangements with NASA.

Only the central service points or central points of document acquisition and control within qualified organizations are eligible to register for NASA products and services. Domestic organizations that may be eligible to receive various classes of NASA publications and services should address their requests for registration or for further information to:

NASA Scientific and Technical Information Facility
ATTN: Registration Activity
P.O. Box 8757
B.W.I. Airport, Maryland 21240

Organizations abroad should direct requests to the same address, but to the attention of: International Exchange Program.

AVAILABILITY OF *STAR* ABSTRACTS ON MICROFICHE

Microfiche of the abstract sections of this issue and other issues of *STAR* are available on annual subscription from NTIS, Attn: Subscriptions, 5285 Port Royal Road, Springfield, Virginia 22161. Annual subscription rates are $60.00 North America; $120.00 foreign. Abstract sections for previous years retroactive to 1964 are available at the current rates. Microfiche for individual *STAR* issue abstract sections are not available.

ADDRESSES OF ORGANIZATIONS

American Institute of Aeronautics and Astronautics
Technical Information Service
555 West 57th Street, 12th Floor
New York, New York 10019

British Library Lending Division,
Boston Spa, Wetherby, Yorkshire,
England

Commissioner of Patents and Trademarks
U.S. Patent and Trademark Office
Washington, D.C. 20231

Department of Energy
Technical Information Center
P.O. Box 62
Oak Ridge, Tennessee 37830

ESA-Information Retrieval Service
ESRIN
Via Galileo Galilei
00044 Frascati (Rome) Italy

Fachinformationszentrum Energie, Physik, Mathematik GMBH
7514 Eggenstein Leopoldshafen
Federal Republic of Germany

Her Majesty's Stationery Office
P.O. Box 569, S.E. 1
London, England

NASA Scientific and Technical Information Facility
P.O. Box 8757
B.W.I. Airport, Maryland 21240

National Aeronautics and Space Administration
Scientific and Technical Information Branch (NST-41)
Washington, D.C. 20546

National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161

Pendragon House, Inc.
899 Broadway Avenue
Redwood City, California 94063

Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

University Microfilms
A Xerox Company
300 North Zeeb Road
Ann Arbor, Michigan 48106

University Microfilms, Ltd.
Tylers Green
London, England

U.S. Geological Survey
1033 General Services Administration Building
Washington, D.C. 20242

U.S. Geological Survey
601 E. Cedar Avenue
Flagstaff, Arizona 86002

U.S. Geological Survey
345 Middlefield Road
Menlo Park, California 94025

U.S. Geological Survey
Bldg. 25, Denver Federal Center
Denver, Colorado 80225

NTIS PRICE SCHEDULES

Schedule A

STANDARD PAPER COPY PRICE SCHEDULE

(Effective January 1, 1983)

Price Code	Page Range	North American Price	Foreign Price
A01	Microfiche	$ 4.50	$ 9.00
A02	001-025	7.00	14.00
A03	026-050	8.50	17.00
A04	051-075	10.00	20.00
A05	076-100	11.50	23.00
A06	101-125	13.00	26.00
A07	126-150	14.50	29.00
A08	151-175	16.00	32.00
A09	176-200	17.50	35.00
A10	201-225	19.00	38.00
A11	226-250	20.50	41.00
A12	251-275	22.00	44.00
A13	276-300	23.50	47.00
A14	301-325	25.00	50.00
A15	326-350	26.50	53.00
A16	351-375	28.00	56.00
A17	376-400	29.50	59.00
A18	401-425	31.00	62.00
A19	426-450	32.50	65.00
A20	451-475	34.00	68.00
A21	476-500	35.50	71.00
A22	501-525	37.00	74.00
A23	526-550	38.50	77.00
A24	551-575	40.00	80.00
A25	576-600	41.50	83.00
A99	601-up	-- 1	-- 2

1/ Add $1.50 for each additional 25 page increment or portion thereof for 601 pages up.

2/ Add $3.00 for each additional 25 page increment or portion thereof for 601 pages and more.

Schedule E

EXCEPTION PRICE SCHEDULE

Paper Copy & Microfiche

Price Code	North American Price	Foreign Price
E01	$ 6.50	$ 13.50
E02	7.50	15.50
E03	9.50	19.50
E04	11.50	23.50
E05	13.50	27.50
E06	15.50	31.50
E07	17.50	35.50
E08	19.50	39.50
E09	21.50	43.50
E10	23.50	47.50
E11	25.50	51.50
E12	28.50	57.50
E13	31.50	63.50
E14	34.50	69.50
E15	37.50	75.50
E16	40.50	81.50
E17	43.50	88.50
E18	46.50	93.50
E19	51.50	102.50
E20	61.50	123.50
E-99 - Write for quote		
N01	35.00	45.00

VOLUME 21 NUMBER 1/JANUARY 8, 1983

TABLE OF CONTENTS

AERONAUTICS

Includes aeronautics (general); aerodynamics; air transportation and safety; aircraft communications and navigation; aircraft design, testing and performance; aircraft instrumentation; aircraft propulsion and power; aircraft stability and control; and research and support facilities (air).

For related information see also *Astronautics*.

01 AERONAUTICS (GENERAL) 1

02 AERODYNAMICS 3

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer*

03 AIR TRANSPORTATION AND SAFETY 4

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION 5

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command and Tracking* and *32 Communications.*

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE 6

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

06 AIRCRAFT INSTRUMENTATION 7

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

07 AIRCRAFT PROPULSION AND POWER 8

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

08 AIRCRAFT STABILITY AND CONTROL 9

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

09 RESEARCH AND SUPPORT FACILITIES (AIR) 14

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

For related information see also *Aeronautics*

12 ASTRONAUTICS (GENERAL) 15

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

13 ASTRODYNAMICS N.A.

Includes powered and free-flight trajectories; and orbit and launching dynamics.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE) N.A.

Includes launch complexes, research and production facilities; ground support equipment, e.g., mobile transporters; and simulators.

For related information see also *09 Research and Support Facilities (Air).*

15 LAUNCH VEHICLES AND SPACE VEHICLES 16

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

16 SPACE TRANSPORTATION 17

Includes passenger and cargo space transportation, e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

17 SPACECRAFT COMMUNICATION, COMMAND AND TRACKING N.A.

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE 18

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

19 SPACECRAFT INSTRUMENTATION N.A.

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

20 SPACECRAFT PROPULSION AND POWER 18

Includes main propulsion systems and components, e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general); composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels.

23 CHEMISTRY AND MATERIALS (GENERAL) 19
Includes biochemistry and organic chemistry.

24 COMPOSITE MATERIALS 19
Includes laminates.

25 INORGANIC AND PHYSICAL CHEMISTRY 21
Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.
For related information see also *77 Thermodynamics and Statistical Physics.*

26 METALLIC MATERIALS 26
Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

27 NONMETALLIC MATERIALS 30
Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

28 PROPELLANTS AND FUELS 33
Includes rocket propellants, igniters, and oxidizers; storage and handling; and aircraft fuels.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics.
For related information see also *Physics.*

31 ENGINEERING (GENERAL) 34
Includes vacuum technology; control engineering; display engineering; and cryogenics.

32 COMMUNICATIONS 47
Includes land and global communications; communications theory; and optical communications.
For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

33 ELECTRONICS AND ELECTRICAL ENGINEERING 53
Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuity.
For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

34 FLUID MECHANICS AND HEAT TRANSFER 58
Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.
For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

35 INSTRUMENTATION AND PHOTOGRAPHY 62
Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.
For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation* and *19 Spacecraft Instrumentation.*

36 LASERS AND MASERS 64
Includes parametric amplifiers.

37 MECHANICAL ENGINEERING 65
Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

38 QUALITY ASSURANCE AND RELIABILITY 66
Includes product sampling procedures and techniques; and quality control.

39 STRUCTURAL MECHANICS 67
Includes structural element design and weight analysis; fatigue; and thermal stress.
For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

GEOSCIENCES

Includes geosciences (general); earth resources; energy production and conversion; environment pollution; geophysics; meteorology and climatology; and oceanography.
For related information see also *Space Sciences.*

42 GEOSCIENCES (GENERAL) N.A.

43 EARTH RESOURCES 72
Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.
For instrumentation see *35 Instrumentation and Photography.*

44 ENERGY PRODUCTION AND CONVERSION 77
Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.
For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

45 ENVIRONMENT POLLUTION 98
Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

46 GEOPHYSICS 103
Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.
For space radiation see *93 Space Radiation.*

47 METEOROLOGY AND CLIMATOLOGY 109
Includes weather forecasting and modification.

48 OCEANOGRAPHY 112
Includes biological, dynamic and physical oceanography; and marine resources.

LIFE SCIENCES

Includes sciences (general); aerospace medicine; behavioral sciences; man/system technology and life support; and planetary biology.

51 LIFE SCIENCES (GENERAL) 114
Includes genetics.

52 AEROSPACE MEDICINE 116
Includes physiological factors; biological effects of radiation; and weightlessness.

53 BEHAVIORAL SCIENCES 118
Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT 120
Includes human engineering; biotechnology; and space suits and protective clothing.

55 PLANETARY BIOLOGY N.A.
Includes exobiology; and extraterrestrial life.

MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general); computer operations and hardware; computer programming and software; computer systems; cybernetics; numerical analysis; statistics and probability; systems analysis; and theoretical mathematics.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL) 120

60 COMPUTER OPERATIONS AND HARDWARE 121
Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

61 COMPUTER PROGRAMMING AND SOFTWARE 122
Includes computer programs, routines, and algorithms.

62 COMPUTER SYSTEMS 126
Includes computer networks.

63 CYBERNETICS 127
Includes feedback and control theory.
For related information see also *54 Man/System Technology and Life Support.*

64 NUMERICAL ANALYSIS 128
Includes iteration, difference equations, and numerical approximation.

65 STATISTICS AND PROBABILITY 130
Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

66 SYSTEMS ANALYSIS 132
Includes mathematical modeling; network analysis; and operations research.

67 THEORETICAL MATHEMATICS 132
Includes topology and number theory.

PHYSICS

Includes physics (general); acoustics; atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics.
For related information see also *Engineering.*

70 PHYSICS (GENERAL) 132
For geophysics see *46 Geophysics.* For astrophysics see *90 Astrophysics.* For solar physics see *92 Solar Physics.*

71 ACOUSTICS 133
Includes sound generation, transmission, and attenuation.
For noise pollution see *45 Environment Pollution.*

72 ATOMIC AND MOLECULAR PHYSICS 134
Includes atomic structure and molecular spectra.

73 NUCLEAR AND HIGH-ENERGY PHYSICS 135
Includes elementary and nuclear particles; and reactor theory.
For space radiation see *93 Space Radiation.*

74 OPTICS 136
Includes light phenomena.

75 PLASMA PHYSICS 137
Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics.* For space plasmas see *90 Astrophysics.*

76 SOLID-STATE PHYSICS 144
Includes superconductivity.
For related information see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

77 THERMODYNAMICS AND STATISTICAL PHYSICS N.A.
Includes quantum mechanics; and Bose and Fermi statistics.
For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

SOCIAL SCIENCES

Includes social sciences (general); administration and management; documentation and information science; economics and cost analysis; law and political science; and urban technology and transportation.

80 SOCIAL SCIENCES (GENERAL) 146
Includes educational matters.

81 ADMINISTRATION AND MANAGEMENT 146
Includes management planning and research.

82 DOCUMENTATION AND INFORMATION SCIENCE **147**
Includes information storage and retrieval technology; micrography; and library science.
For computer documentation see *61 Computer Programming and Software.*

83 ECONOMICS AND COST ANALYSIS **N.A.**
Includes cost effectiveness studies.

84 LAW AND POLITICAL SCIENCE **148**
Includes space law; international law; international cooperation; and patent policy.

85 URBAN TECHNOLOGY AND TRANSPORTATION **149**
Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.
For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

SPACE SCIENCES

Includes space sciences (general); astronomy; astrophysics; lunar and planetary exploration; solar physics; and space radiation.
For related information see also *Geosciences.*

88 SPACE SCIENCES (GENERAL) **N.A.**

89 ASTRONOMY **149**
Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

90 ASTROPHYSICS **150**
Includes cosmology; and interstellar and interplanetary gases and dust.

91 LUNAR AND PLANETARY EXPLORATION **151**
Includes planetology; and manned and unmanned flights.
For spacecraft design see *18 Spacecraft Design, Testing and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

92 SOLAR PHYSICS **151**
Includes solar activity, solar flares, solar radiation and sunspots.

93 SPACE RADIATION **152**
Includes cosmic radiation; and inner and outer earth's radiation belts.
For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

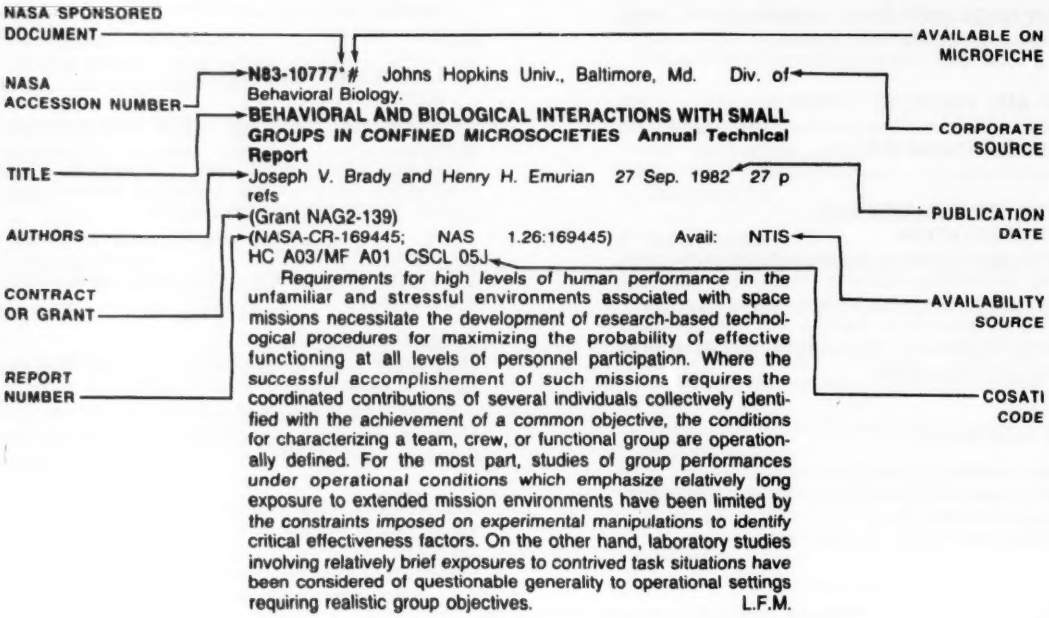
GENERAL

99 GENERAL **152**

Note: N.A. means that no abstracts were assigned to this category for this issue.

SUBJECT INDEX **I-1**
PERSONAL AUTHOR INDEX **I-59**
CORPORATE SOURCE INDEX **I-67**
CONTRACT NUMBER INDEX **I-81**
REPORT/ACCESSION NUMBER INDEX **I-83**

TYPICAL CITATION AND ABSTRACT


NASA SPONSORED DOCUMENT
AVAILABLE ON MICROFICHE
NASA ACCESSION NUMBER
N83-10777* # Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.
CORPORATE SOURCE
TITLE
BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report
AUTHORS
Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs
PUBLICATION DATE
CONTRACT OR GRANT
(Grant NAG2-139)
REPORT NUMBER
(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J
AVAILABILITY SOURCE
COSATI CODE
Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

VOLUME 21 NUMBER 1 / JANUARY 8, 1983

Scientific and Technical Aerospace Reports

A Semimonthly Publication of the National Aeronautics and Space Administration

01 AERONAUTICS (GENERAL)

N83-10001*# National Aeronautics and Space Administration, Washington, D. C.
AERONAUTICAL ENGINEERING. A CONTINUING BIBLIOGRAPHY WITH INDEXES (SUPPLEMENT 151)
Aug. 1982 118 p
(NASA-SP-7037(151); NAS 1.21:7037(151)) Avail: NTIS HC $5.00 CSCL 01A

This bibliography lists 362 reports, articles and other documents introduced into the NASA Scientific and Technical Information System in July 1982. Author

N83-10002*# National Aeronautics and Space Administration, Washington, D. C.
JBFA-BUOYANT FLIGHT, SPECIAL EDITION
Chuta Wada, Kazuhiko Terada, Chizuru Ishii, Kazuo Nagamatsu, Mitsuo Makino, and Saburo Ichiyoshi Feb. 1982 134 p refs Transl. into ENGLISH of "JBFA-Buiyanto Koku" Japan, v. 7, no. 1, 1981 p 1-96 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76814; NAS 1.15:76814) Avail: NTIS HC A07/MF A01 CSCL 01B

Progress in the project to traverse the Pacific Ocean by manned balloon is summarized. The development of a hybrid lighter than aircraft combining the buoyancy of a gas bag with the vertical lift off capabilities of the helicopter is also addressed. A.R.H.

N83-10003# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ACTA AERONAUTICA ET ASTRONAUTICA SINICA
23 Jun. 1982 159 p refs Transl. into ENGLISH of Acta Aeron. Acta Sinica (China), v. 2, no. 3, Sep. 1981 p 1-103
(AD-A117465; FTD-ID(RS)T-0285-82) Avail: NTIS HC A08/MF A01 CSCL 01/2

Aerodynamics, structural mechanics of aircraft components and aircraft construction materials, flight mechanics, aircraft propulsion systems, and computational methods are discussed. For individual titles, see N83-10004 through N83-10015.

N83-10004# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERODYNAMIC CHARACTERISTICS OF MANEUVERING FLAPS c02
Bacyui Fang, Huixuan Wang, and Yulian Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 1-20 Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 20 p Original language document announced as A82-22110 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

The use of maneuvering flaps to improve the air combat capability of fighter aircraft was investigated. Data from wind tunnel tests was used to examine the capability and effect of maneuvering flaps in drag reduction, the effect of flap chord and flap span, the problem of matching the leading and trailing edge, the effect of the shapes of wing strake and wing plane on drag reduction, and the improvement of flight quality at large angles of attack through use of maneuvering flaps. It was determined that the use of maneuvering flaps is effective in improving combat capability through control of flow separation and decrease of drag at large angles of attack, and through expansion of the buffet boundary and reduction of the buffet intensity. The best combined effects are obtained through considering the effects of maneuvering flap parameters on the aircraft structure and system. Author

N83-10005# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL CALCULATION OF LIFT, MOMENT COEFFICIENT AND DYNAMIC STABILITY DERIVATIVE ON SIDESLIPPING WINGS IN UNSTEADY SUPERSONIC FLOWS c02
Guofu Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 21-33 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 13 p Original language document announced as A82-22111 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

A numerical solution of unsteady supersonic flows of sideslipping wings utilizing the characteristic lines network method of unsteady supersonic forces distributed on the wing plane is presented. The oscillating mode of undulatory, pitching, and rolling harmonic oscillations of sideslipping wings and the methods for calculation of lift, moment coefficient, and dynamic stability derivatives (including cross coupling derivatives) are demonstrated. The dynamic stability derivatives of a typical wing without sideslipping calculated using the numerical method of nonstationary theory are compared with results obtained using the more common analytical formula of quasistationary theory. Author

N83-10006# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL COMPUTATION OF UNSTEADY SUBSONIC AERODYNAMIC FORCES ON WING-BODY-TAIL EXPOSED TO TRAVELING GUST c02
Gonghi Wen and Zhongshu Sun *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 34-44 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 11 p Original language document announced as A82-22112 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

The unsteady aerodynamic characteristics of complex subsonic wing-body-tail configurations undergoing traveling gust induced by shock waves. The finite element method was employed to compute unsteady aerodynamic forces for various blast orientations, elevation angles, and complex plane forms. The results were found to be in good agreement with experimental data. Author

N83-10007# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATION OF STRESS INTENSITY FACTORS WITH HY-

BRID STRESS ELEMENTS AND ISOPARAMETRIC ELEMENTS **c39**

Jifan He, Liangming Chang, Zhanmin Gao, Zhousheng Li, and Duxin Sun *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 45-59 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 15 p Original language document announced as A82-22113 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

A singular hybrid stress element and isoparametric elements for calculation of the stress intensity factors and J integral of plane cracks are introduced. The method demonstrates high accuracy, short computation time, and ease of practical application. Three examples of the application of the method using 216 to 256 degrees of freedom are presented. The calculated results are compared with results obtained using the analytical method and other singular element methods. The stress intensity factors obtained are within 1 to 2% of those obtained using the analytical method. The scatter of the J integral values from four to six integral paths is within 7%. The computation was performed on a 7Q-16 computer. Compilation of the program took about six to seven minutes, and each example required six to eight minutes to compute. Author

N83-10008# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

AN ATTEMPT TO DERIVE A VARYING THICKNESS PLATE ELEMENT FROM HYBRID DISPLACEMENT METHOD **c39**

Gongxing Zhang and Junjiang Yu *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 60-71 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 12 p Original language document announced as A82-22114 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

The derivation and testing of a varying thickness plate element belonging to the three variable hybrid displacement model are demonstrated. The relevant matrices are expressed explicitly. The derivation and application of this type of model is discussed. The three variable hybrid displacement method is demonstrated to be better suited for the analysis of plates of varying thickness than the two hybrid displacement method. Two possibilities for obtaining concrete expressions of elements when the three variable method is used in the derivative are demonstrated. Author

N83-10009# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

ON THE VIBRATION OF FIBER REINFORCED LAMINATED PLATES **c24**

Jidong Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 72-79 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 8 p (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

The exact solutions of the free vibration of simply supported laminated rectangular plates having arbitrary cross plies are employed to investigate the applicability of classical laminated plate vibration theory and the theory of laminated plate vibration when shear deformation is taken into consideration. The effect of inertial forces in two directions in the plane of the plate was considered in the context of classical laminated plate transverse vibration theory. Author

N83-10010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

A DYNAMIC REDUCING ITERATIVE METHOD FOR SOLVING LARGE GENERALIZED EIGENVALUE PROBLEMS **c64**

Wen Zhang and Zhikun Hou *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 80-92 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 13 p Original language document announced as A82-22116 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

The Guyan reduction method as modified by the dynamic reduction concept of Kuhar et al is applied to the solution of generalized eigenvalue problems, such as those deduced from finite elements. Generalized eigenvalue problems are discussed, and the dynamic reduction iterative method for approaching the exact solution iteratively proposed. The criterion of partition of the primary and the secondary coordinates sets is presented. The method is applied to practical problems and its effectiveness verified by comparison with experimental results. The method is demonstrated to be capable of analyzing large complicated dynamic systems and overcoming limitations on computer capacity, while providing the required accuracy and reducing computer running time. J.D.

N83-10011# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

STATISTICAL ESTIMATION OF LIQUID PROPELLENT ROCKET ENGINE PARAMETERS **c20**

Gouwei He *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 93-100 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 8 p Original language document announced as A82-22117 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

Let the performance parameter X of a set of liquid propellant rocket engines be the normal probability distribution of mu and sigma. Sigma(1) = sigma(2) sub Alpha + sigma(2) sub Epsilon, where sigma(2) sub Epsilon is the engine to engine variance and sigma(2) sub Alpha is the engine run to run variance. The design criteria are ('mu) belongs to the set [mu sub L, sub upsilon], and sigma is < or equal to B('). A method of determining whether the design criteria are satisfied by the confidence coefficient, based on a sat of experimental data, is proposed. Author

N83-10012# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

NUMERICAL TESTS OF THREE-DIMENSIONAL FLOW IN A TRANSONIC TURBINE **c34**

Yaoke Zhang, Zengjin Gong, and Mengyu Shen *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 101-116 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 16 p Original language document announced as A82-22118 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

A computation scheme for plane cascades and cascades of the general surface of revolution is generalized to three dimensional flow, starting from the integral form of the basic equations. A computer program was developed and the preliminary results of numerical tests are presented. Comparison between the numerical solutions of quasi-three dimensional and fully three dimensional flows indicates that the quasi-three dimensional assumptions may lead to significant errors. This confirms the necessity of fully three dimensional calculation. If about 2000 grid points are assigned, 100 minutes is required to calculate one case on the 013 computer. From the application point of view, this is not considered to be excessive run time. Author

N83-10013# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE EFFECT OF THE STATOR WITH UNEQUAL PITCH CASCADES ON THE COMPRESSOR BLADE VIBRATION **c07**

Zucchang Li *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 117-127 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 11 p Original language document announced as A82-22119 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

Dynamic stress tests of the compressor blade in a gas turbine engine in which the compressor stator has cascades of unequal pitches are analyzed to determine the effect of two kinds of such arrangements on the blade vibration. In comparison with stators having equally pitched cascades, the average vibratory stress of one arrangement was determined to decrease by 30.8% and the

other by 42%. Some relatively complex phenomena observed are discussed. It was observed that the frequency of resonant revolutions greatly increased and the beat phenomenon appeared in all the vibratory signals of one of the arrangements. Stress test results are analyzed by expanding the wake excitation force of the stator by the Fourier series. The resulting frequency spectrum of the excitation forces agrees well with tested results. The solution of the forced vibration equation of the blade is also investigated in order to explain the dynamic response and the beat phenomenon observed in the tests. Author

N83-10014# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE SIMULATION STUDY ON A REDUNDANT FLIGHT CONTROL SYSTEM
Dajion Xue *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 128-143 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 16 p Original language document announced as A82-22120 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

A triple redundant flight control simulation is discussed. The effect of the redundancy on improving the reliability of automatic flight control systems is considered. The performance requirements of the selectors, the comparators, and the active standby redundant rudder mechanism are discussed and their effects on failure transients, failure coverage, and mis-disconnection are analyzed. Author

N83-10015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A RAPIDLY RECURSIVE METHOD FOR THE B-SPLINES c64
Qisun Yuan *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 144-155 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 12 p (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

A rapidly recursive method for determining the B-splines of any order on uniformly space node sequences is presented. The recursive formulation and the programming are discussed. Examples are presented demonstrating that this method is an intuitive, rapidly recursive and computationally simple method for the mathematical analysis and application of B-splines. Its use for computer aided geometric design and finite element calculations is discussed. Author

02 AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces; and internal flow in ducts and turbomachinery.

For related information see also *34 Fluid Mechanics and Heat Transfer.*

N83-10016*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
AN EXPERIMENTAL AND THEORETICAL INVESTIGATION OF THICK WINGS AT VARIOUS SWEEP ANGLES IN AND OUT OF GROUND EFFECT
John W. Paulson, Jr. and Scott O. Kjelgaard Oct. 1982 165 p refs
(NASA-TP-2068; L-15314; NAS 1.60:2068) Avail: NTIS HC A08/MF A01 CSCL 01A

The effects of sweep and aspect ratio on the longitudinal aerodynamics of a wing in and out of ground effect are analyzed. Experimental data were obtained in the Langley 4 by 7 Meter Tunnel for a wing with various sweep angles, aspect ratios, and flap deflections both in and out of ground effect. Theoretical predictions of the out of ground effect lift coefficients and flap effectiveness and the in ground effect lift coefficients are compared with the experimental results. As expected, the lift curve slope and flap effectiveness are reduced when the aspect ratio is reduced or the sweep angle is increased both in and out of ground effect. In ground effect, the lift and flap effectiveness are increased above a wing height to span ratio of 0.15. However, with flap deflections less than or equal to 10 deg and an angle of attack near 0 deg lift is markedly decreased at very low heights above the ground plane. This trend is not predicted by planar theoretical models but is predicted by a surface panel method where thickness effects are included. Author

N83-10017*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
COMPARISON OF ANALYTICAL AND EXPERIMENTAL SUBSONIC STEADY AND UNSTEADY PRESSURE DISTRIBUTIONS FOR A HIGH-ASPECT-RATIO-SUPERCRITICAL WING MODEL WITH OSCILLATING CONTROL SURFACES
William E. McCain Aug. 1982 53 p refs
(NASA-TM-84490; NAS 1.15:84490) Avail: NTIS HC A04/MF A01 CSCL 01A

The results of a comparative study using the unsteady aerodynamic lifting surface theory, known as the Doublet Lattice method, and experimental subsonic steady- and unsteady-pressure measurements, are presented for a high-aspect-ratio supercritical wing model. Comparisons of pressure distributions due to wing angle of attack and control-surface deflections were made. In general, good correlation existed between experimental and theoretical data over most of the wing planform. The more significant deviations found between experimental and theoretical data were in the vicinity of control surfaces for both static and oscillatory control-surface deflections. Author

N83-10018*# United Technologies Research Center, East Hartford, Conn.
ANALYSIS OF AIRFOIL LEADING EDGE SEPARATION BUBBLES Interim Report, 1 Apr. 1981 - 15 Jun. 1982
J. E. Carter and V. N. Vatsa Hampton, Va. NASA. Langley Research Center May 1982 52 p refs
(Contract NAS1-16585)
(NASA-CR-165935; NAS 1.26:165935; R82-915622-8) Avail: NTIS HC A04/MF A01 CSCL 01A

A local inviscid-viscous interaction technique was developed for the analysis of low speed airfoil leading edge transitional separation bubbles. In this analysis an inverse boundary layer finite difference analysis is solved iteratively with a Cauchy integral representation of the inviscid flow which is assumed to be a linear perturbation to a known global viscous airfoil analysis. Favorable comparisons with data indicate the overall validity of the present localized interaction approach. In addition numerical tests were performed to test the sensitivity of the computed results to the mesh size, limits on the Cauchy integral, and the location of the transition region. M.G.

N83-10019*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
WIND TUNNEL TESTS OF A ZERO LENGTH, SLOTTED-LIP ENGINE AIR INLET FOR A FIXED NACELLE V/STOL AIRCRAFT
R. R. Woollett, W. E. Beck, Jr. (Lockheed-California Co., Burbank), and E. R. Glasgow (Lockheed-California Co., Burbank) Aug. 1982 117 p refs
(NASA-TM-82939; E-1338; NAS 1.15:82939) Avail: NTIS HC A06/MF A01 CSCL 01A

Zero length, slotted lip inlet performance and associated fan blade stresses were determined during model tests using a 20 inch diameter fan simulator in the NASA-LeRC 9 by 15 foot low speed wind tunnel. The model configuration variables consisted of inlet contraction ratio, slot width, circumferential extent of slot fillers, and length of a constant area section between the inlet throat and fan face. The inlet performance was dependent on slot gap width and relatively independent of inlet throat/fan face spacer length and slot flow blockage created by 90 degree slot fillers. Optimum performance was obtained at a slot gap width of 0.36 inch. The zero length, slotted lip inlet satisfied all critical low

speed inlet operating requirements for fixed horizontal nacelles subsonic V/STOL aircraft. Author

N83-10020# Cambridge Univ. (England). Dept. of Physics and Chemistry of Solids.
REDUCTION OF AERODYNAMIC DRAG: TORSION DISC VISCOMETRY Interim Report, May - Dec. 1981
W. A. Wilby and J. E. Field Jan. 1982 37 p refs
(Grant AF-AFOSR-0057-79; AF Proj. 2307)
(AD-A117859; AFOSR-82-0619TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

This report describes the design, construction and evaluation of a working torsion disc viscometer. Initial tests at gas pressures between 9.1 mbar and 1000 mbar show that the theory of the instrument is adequate and that the viscometer is capable of detecting small changes in gas viscosity. A thorough investigation of the effect of radioactive irradiation on gas viscosity will be made shortly, following the work of Kestin and sHah. An analysis of their approach is given here, viewed in the light of our preliminary work, and suggests the most likely ways of achieving a change in gas viscosity. Author (GRA)

N83-10021# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Unternehmensbereich Drehfluegler.
CALCULATION OF THREE DIMENSIONAL UNSTEADY TRANSONIC FLOW AROUND ROTOR BLADES
H. Stahl 19 Mar. 1982 16 p refs Presented at AGARD Fluid Dyn. Panel Specialists Meeting on Prediction of Aerodyn. Loads on Rotorcraft, London, 17-18 May 1982
(MBB-UD-353) Avail: Issuing Activity

The application and adaptation of classical wing methods to the special requirements of rotor blade tip flow are described. The problem is split up into two principal parts: (1) the three dimensional steady flow and (2) the two dimensional unsteady case. The unsteady calculation is carried out by a finite difference method for the two dimensional case, considering both the angle of attack and the Mach number variation. The three dimensional calculation is based on a finite element model for fixed wings which is adapted for the rotor blade application by a linearly varying velocity distribution over the blade radius. Only the outer 25% of the radius is taken into account. Several parameters, such as tip Mach number and angle of attack, were investigated. A model is suggested that determines the final lift and moment distributions on the blade by superposition of three dimensional steady and two dimensional unsteady results. Author (ESA)

N83-10004# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AERODYNAMIC CHARACTERISTICS OF MANEUVERING FLAPS
Bacyui Fang, Huixuan Wang, and Yulian Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 1-20 Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 20 p Original language document announced as A82-22110 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

N83-10005# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL CALCULATION OF LIFT, MOMENT COEFFICIENT AND DYNAMIC STABILITY DERIVATIVE ON SIDESLIPPING WINGS IN UNSTEADY SUPERSONIC FLOWS
Guofu Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 21-33 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 13 p Original language document announced as A82-22111 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

N83-10006# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL COMPUTATION OF UNSTEADY SUBSONIC AERODYNAMIC FORCES ON WING-BODY-TAIL EXPOSED TO TRAVELING GUST
Gonghi Wen and Zhongshu Sun *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 34-44 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 11 p Original language document announced as A82-22112 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

03 AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

For related information see also *16 Space Transportation* and *85 Urban Technology and Transportation.*

N83-10022# National Transportation Safety Board, Washington, D. C.
AIRCRAFT ACCIDENT REPORT. AIR FLORIDA, INC. BOEING 737-222, N62AF COLLISION WITH 14TH STREET BRIDGE, NEAR WASHINGTON NATIONAL AIRPORT, WASHINGTON, D.C., JANUARY 13, 1982
10 Aug. 1982 142 p
(PB82-916408; NTSB-AAR-82-8) Avail: NTIS HC A07/MF A01 CSCL 01C

On January 13, 1982, Air Florida Flight 90, a Boeing 737-222 (N62AF), was a scheduled flight to Fort Lauderdale, Florida, from Washington National Airport, Washington, D.C. There were 74 passengers, including 3 infants, and 5 crewmembers on board. The flight's scheduled departure time was delayed about 1 hour 45 minutes due to a moderate to heavy snowfall which necessitated the temporary closing of the airport. Following takeoff from runway 36, which was made with snow and/or ice adhering to the aircraft, the aircraft at 1601 e.s.t. crashed into the barrier wall of the northbound span of the 14th Street Bridge, which connects the District of Columbia with Arlington County, Virginia, and plunged into the ice covered Potomac River. It came to rest on the west side of the bridge 0.75 nmi from the departure end of runway 36. Four passengers and one crewmember survived the crash. When the aircraft hit the bridge, it struck seven occupied vehicles and then tore away a section of the bridge barrier wall and bridge railing. Four persons in the vehicles were killed; four were injured. Author

N83-10023*# Texas Technological Univ., Lubbock. Dept. of Electrical Engineering.
LABORATORY MODELING AND ANALYSIS OF AIRCRAFT-LIGHTNING INTERACTIONS
C. D. Turner and T. F. Trost Aug. 1982 168 p refs
(Grant NAG1-28)
(NASA-CR-169455; NAS 1.26:169455) Avail: NTIS HC A08/MF A01 CSCL 01C

Modeling studies of the interaction of a delta wing aircraft with direct lightning strikes were carried out using an approximate scale model of an F-106B. The model, which is three feet in length, is subjected to direct injection of fast current pulses supplied by wires, which simulate the lightning channel and are attached at various locations on the model. Measurements are made of the resulting transient electromagnetic fields using time derivative sensors. The sensor outputs are sampled and digitized by computer. The noise level is reduced by averaging the sensor output from ten input pulses at each sample time. Computer analysis of the measured fields includes Fourier transformation and the computation of transfer functions for the model. Prony analysis is also used to determine the natural frequencies of the model. Comparisons of model natural frequencies extracted by Prony analysis with those for in flight direct strike data usually show lower damping in the in flight case. This is indicative of either a lightning channel with a higher impedance than the wires on the model, only one attachment point, or short streamers instead of a long channel. Author

N83-10024*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
LOW-ALTITUDE WIND MEASUREMENTS FROM WIDE-BODY JET TRANSPORTS
R. Earl Dunham, Jr. Oct. 1982 45 p refs
(NASA-TM-84538; L-15321; NAS 1.15:84538) Avail: NTIS HC A03/MF A01 CSCL 01C

For a 2-week period in the spring of 1977, data were collected onboard wide-body jet transports for the determination of winds and wind shear during landings and take-offs. The data represent about 640 take-offs or landings at 14 airports in Europe and the United States. Analysis of the wind-shear data indicates that shears of a given value are equally likely to occur at any altitude in the lower 1400-ft section of the atmosphere. Analysis of the data indicates that low shears (plus or minus .033 knot/per ft) have a 67-percent chance of occurrence during a landing or take-off, while higher values (plus or minus 0.15 knot/per ft) have a 0.5-percent chance of occurrence. A determination of the duration of a given shear was not made. Author

N83-10025# McDonnell-Douglas Corp., Long Beach, Calif.
A COMBINED HAZARD INDEX FIRE TEST METHODOLOGY FOR AIRCRAFT CABIN MATERIALS, VOLUME 1 Final Report, Sep. 1977 - Nov. 1981
H. H. Spieth, J. G. Gaume, R. E. Luoto, and D. M. Klinck Apr. 1982 168 p refs 2 Vol.
(Contract DOT-FA77WA-4019)
(AD-A117448; DOT/FAA/CT-82/36-1) Avail: NTIS HC A08/MF A01 CSCL 01/3

This report describes a laboratory test method and the modeling of the resultant data to produce a means of ranking aircraft cabin materials for the combined hazards produced in a survivable post-crash fire. Ranking is based on reducing each hazard accumulating in a cabin during a 5-minute crash fire scenario to the common denominator of a passenger escape time. Combined Hazards Index (CHI) is expressed as the number of seconds of scenario burn time at which the sum of the fractional hazards doses reaches an escape limit. All data was obtained using a computer-augmented Ohio State University Calorimeter modified to measure the major combustion gases in addition to heat and smoke as a material burns. A computerized fire analysis model was developed to predict cabin environmental hazards from the laboratory data. A human survival model relating short term hazard dose to incapacitation time was incorporated in this program. The changing cabin environment was compared continuously with the human survival model limits to calculate the unaided escape time ranking for each material. GRA

N83-10026# McDonnell-Douglas Corp., Long Beach, Calif.
A COMBINED HAZARD INDEX FIRE TEST METHODOLOGY FOR AIRCRAFT CABIN MATERIALS, VOLUME 2 Final Report
H. H. Spieth, J. G. Gaume, R. E. Luoto, and D. M. Klinck Apr. 1982 217 p refs 2 Vol.
(Contract DOT-FA77WA-4019)
(AD-A117449; DOT/FAA/CT-82/36-2) Avail: NTIS HC A10/MF A01 CSCL 01/3

This report supplements the description of the methodology developed for ranking cabin materials for combined hazards generated in a survivable crash fire presented in Part 1 of the report. More comprehensive procedures are presented for the calibration and operation of the computer-augmented Ohio State University Calorimeter modified to derive the new materials fire hazards testing apparatus known as the Combined Hazards Analysis System (CHAS). Definitive derivations of the human survival models for temperature, smoke, and toxic gases used in the hazards analysis and a thorough presentation of the mathematics used in the FORTRAN Fire Analysis Computer Program are presented. A full description of the full-scale fire testing method used during the development and demonstration phases of the program is presented to give a better understanding of the capability of the laboratory methodology to rate materials on the basis of the relative passenger escape time potential from a cabin section. Part 2 is, essentially a working manual which will assist greatly those committed to duplicating and successfully operating the CHAS. The CHAS methodology is useful for development of new fire resistant materials. Author (GRA)

04 AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft; air navigation systems (satellite and ground based); and air traffic control.

For related information see also *17 Spacecraft Communications, Command, and Tracking* and *32 Communications.*

N83-10027*# Honeywell, Inc., Minneapolis, Minn. Avionics Div.
DEMONSTRATION ADVANCED AVIONICS SYSTEM (DAAS) FUNCTION DESCRIPTION
A. J. Bailey, D. G. Bailey, R. J. Gaabo, T. G. Lahn, J. C. Larson, E. M. Peterson, J. W. Schuck, D. L. Rodgers, and K. A. Wroblewski Moffett Field, Calif. NASA. Ames Research Center Jan. 1982 204 p Prepared in cooperation with King Radio Corp., Olathe, Kans.
(Contract NAS2-10021)
(NASA-CR-166282; NAS 1.26:166282) Avail: NTIS HC A10/MF A01 CSCL 01D

The Demonstration Advanced Avionics System, DAAS, is an integrated avionics system utilizing microprocessor technologies, data busing, and shared displays for demonstrating the potential of these technologies in improving the safety and utility of general aviation operations in the late 1980's and beyond. Major hardware elements of the DAAS include a functionally distributed microcomputer complex, an integrated data control center, an electronic horizontal situation indicator, and a radio adaptor unit. All processing and display resources are interconnected by an IEEE-488 bus in order to enhance the overall system effectiveness, reliability, modularity and maintainability. A detail description of the DAAS architecture, the DAAS hardware, and the DAAS functions is presented. The system is designed for installation and flight test in a NASA Cessna 402-B aircraft. Author

N83-10028# Toronto Univ., Downsview (Ontario). Inst. for Aerospace Studies.
THE LANDING APPROACH IN VARIABLE WINDS: CURVED GLIDEPATH GEOMETRIES AND WORST-CASE WIND MODELING
Alexander B. Markov Dec. 1981 376 p refs Sponsored by National Research Council and Natural Sciences and Engineering Research Council
(UTIAS-254; ISSN-0082-5255) Avail: NTIS HC A17/MF A01

Analytical and computational techniques that may be applied to predicting aircraft response to hazardous variable winds encountered on the landing approach and to modeling such wind conditions were investigated. A literature review identified a number of areas requiring further study. Of these areas, worst-case wind modeling techniques and modified glidepath geometries based on an estimate of the existing wind profile were pursued. A nonlinear longitudinal and lateral dynamic model is posed for a twin engined STOL transport using look-up table, quasisteady, nonlinear aerodynamics. This dynamic model is employed in computer simulations predicting the aircraft dynamic behavior flying curved glidepath geometries that are based on an a priori estimate of the existing wind profile. These results are assessed to determine the effects of incorrect estimates of the wind profile and the suitability of the kinematic assumptions used in deriving the curved glidepath geometry. Worst-case wind modeling techniques where the form of the wind model is not specified a priori are considered, and extensions to an existing technique are proposed. The worst-case wind modeling problem is viewed as a conflict of interest between the aircraft controller and a wind controller. Author

N83-10029*# Textron Bell Helicopter, Fort Worth, Tex.
INVESTIGATION OF ADVANCED NAVIGATION AND GUIDANCE SYSTEM CONCEPTS FOR ALL-WEATHER ROTORCRAFT OPERATIONS
H. W. Upton, G. E. Boen, and J. Moore Aug. 1982 212 p refs (Contract NAS2-10743)
(NASA-CR-166274; NAS 1.26:166274) Avail: NTIS HC A10/MF A01 CSCL 17G

Results are presented of a survey conducted of active helicopter operators to determine the extent to which they wish to operate in IMC conditions, the visibility limits under which they would operate, the revenue benefits to be gained, and the percent of aircraft cost they would pay for such increased capability. Candidate systems were examined for capability to meet the requirements of a mission model constructed to represent the modes of flight normally encountered in low visibility conditions. Recommendations are made for development of high resolution radar, simulation of the control display system for steep approaches, and for development of an obstacle sensing system for detecting wires. A cost feasibility analysis is included. A.R.H.

N83-10030# Army Test and Evaluation Command, Aberdeen Proving Ground, Md.
FLIGHT TESTING OPERATIONS PROCEDURE Final Report
Jan. 1982 42 p refs
(AD-A116984; TOP-6-3-120) Avail: NTIS HC A03/MF A01 CSCL 17/7

This TOP establishes procedures and provides guidance for the testing of an aircraft heading reference system. The primary objective of this document is to determine if the heading reference system under test performs its intended function, within the aircraft environment, with an accuracy and reliability as determined through the appropriate requirements document. Author (GRA)

N83-10031# Federal Aviation Administration, Washington, D.C. System Research and Development Service.
DIRECT AIRCRAFT VELOCITY DETERMINATION BY L-BAND MOVING TARGET DETECTOR RADAR Final Report
James A. Shannon Jun. 1982 41 p refs
(AD-A117512; DOT/FAA/RD-82/41) Avail: NTIS HC A03/MF A01 CSCL 17/9

The Moving Target Detector (MTD) radar can be used to measure the phase difference of echoes from aircraft returns. From these measurements one can determine directly the radial component of aircraft velocity. Present practice is to determine velocity indirectly from radar position measurements. Results of measuring phase shift differences and corresponding aircraft velocities using an L-Band MTD radar are presented. Observations were made in a clutter free environment. The standard deviation of phase shift differences made from observations on a B727 airplane at a distance of 100 nmi was generally found to be 5 degrees, corresponding to a standard deviation of velocity component of 1.2 knots. The standard deviation of phase shift observed from six slower moving airplanes indicates the standard deviation of phase is generally 18 degrees or less, corresponding to a standard deviation of velocity component of 4.3 knots or less. Reliability is generally 94% for the B727 airplane and about 90% for the small airplanes, although poorer reliability is observed with tangential flight paths. Direct measurement of velocity can be used to provide increased precision in predicting aircraft motion over the short term (2 minutes). GRA

N83-10032# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Inst. fuer Flugfuehrung.
TECHNIQUES FOR AIR TRAFFIC PLANNING AND HANDLING IN THE TERMINAL AREA
Manfred Schubert Jan. 1982 35 p refs In GERMAN; ENGLISH summary
(DFVLR-Mitt-82-04) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 14,90

The planning of landing sequence and aircraft handling was examined at Frankfurt airport. Analysis of air traffic samples for various traffic loads shows that planning depends on the individual tactics of the approach controller. The first heading instruction after the entry of an aircraft into the terminal area influences landing sequence, air traffic handling, integration of different traffic flows, and utilization of disposable runway capacity. Author (ESA)

N83-10033# Office of Technology Assessment, Washington, D.C.
AIRPORT AND AIR TRAFFIC CONTROL SYSTEM
Jan. 1982 152 p refs
(PB82-207606; OTA-STI-175) Avail: NTIS HC A08/MF A01 CSCL 01B

Needed improvements in the United States Air Traffic Control (ATC) system are discussed. Included are: scenarios of future growth in air transportation, alternative ways to increase airport and terminal capacity, technological and economic alternatives to the ATC system modification, and alternatives to the ATC process. L.F.M.

05 AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

For related information see also *18 Spacecraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-10034*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE DESIGN INTEGRATION OF WINGTIP DEVICES FOR LIGHT GENERAL AVIATION AIRCRAFT
Robert V. Gifford and Cornelis P. vanDam (Kansas Univ., Lawrence) Aug. 1982 8 p refs Presented at the ICAS/AIAA Aircraft Systems and Technol. Conf., Seattle, 24 Aug. 1982 Previously announced in IAA as A82-40933
(NASA-TM-83252; NAS 1.15:83252) Avail: NTIS HC A02/MF A01 CSCL 01C
For abstract see A82-40933

N83-10035*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLUTTER CLEARANCE OF THE HORIZONTAL TAIL OF THE BELLANCA SKYROCKET II AIRPLANE
Rodney H. Ricketts, F. W. Cazier, Jr., and Moses G. Farmer Sep. 1982 50 p refs
(NASA-TM-84528; L-15453; NAS 1.15:84528) Avail: NTIS HC A03/MF A01 CSCL 01C

The Skyrocket II is an all composite constructed experimental prototype airplane. A flutter clearance program was conducted on the horizontal tail so that the airplane could be safely flown to acquire natural laminar flow aerodynamic data. Ground vibration test data were used in a lifting surface flutter analysis to predict symmetric and antisymmetric flutter boundaries. Subcritical response data which were acquired during flight tests are compared with the analytical results. The final flutter clearance placard speed was based on flight test data. S.L.

N83-10036# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
DESIGN OF THE LEADING EDGE OF A DELTA WING
Xu Dekang 21 Jun. 1982 17 p Transl. into ENGLISH from Guoji Hangking (China), no. 1, 1982 p 18-20
(AD-A117469; FTD-ID(RS)T-0470-82) Avail: NTIS HC A02/MF A01 CSCL 20/4

Wind tunnel tests prove that for a large sweptback blunt leading edge, it is necessary to control the leading edge flow field only on the outer side of the wing in order to obtain a large angle of incidence, high lift, and low drag. A 60 deg sweptback wing with an elliptic arc blunt leading edge; a small fence on the leading edge; a chordwise slot; and a vortex producing blade under the leading edge are four proposed designs which are simple structures with noticeable effects which improve the longitudinal stability of the wing. When the angle of incidence is small, all four configura-

tions require added drag, especially the spanwise plate which showed the best results with a large angle of incidence and decreased drag. With the vortex producing blade, the drag of the small angle of incidence was somewhat larger. A.R.H.

N83-10037# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Information und Dokumentation.
DESIGN SIMPLIFICATION AND COST REDUCTION OF HELICOPTER TAIL ROTOR DRIVE SYSTEM BY USE OF COMPOSITES
C. M. Herkert, D. Braun, and K. Pfeiffer 1982 28 p Presented at 2nd Intercontinental Soc. for the Adv. of Mater. and Process Eng. (SAMPE) Conf., Stresa, Italy, 8-10 Jun. 1982
(MBB-UD-348) Avail: Issuing Activity

A fiber composite drive shaft and coupling for the BO 105 tail rotor were developed. Design requirements, analytical evaluation and testing, manufacturing and costs of the fiber composite solution for this drive shaft system are explained. Manufacturing technology and tool design are discussed. Static test results are compared with analysis. Dynamic test results for both short and long drive shafts as well as for connector components are shown and evaluated in terms of flight hours. Comparison between metal and composite designs illustrates the cost effectiveness of the later. Author (ESA)

N83-10038# Science Research Council, Chilton (England).
SERC STABILIZED BALLOON PLATFORM Mk 1A GIMBAL ATTACHMENT MODULE STRUCTURAL TEST
P. K. Green 8 Mar. 1982 65 p refs
(PB82-208521; RL-82-014) Copyright. Avail: NTIS HC A04/MF A01 CSCL 01C

Proof load tests were carried out on a specimen gimbal attachment module of the stabilized balloon platform Mk 1A simulating loading at 0 deg and 90 deg platform elevation angles. By extrapolation the module was shown to be capable of meeting the 5 g 'no damage' and 10 g 'no fracture' design cases at 0 deg. Confirmation of adequate strength at 90 deg awaits an additional test on a specimen gimbal internal attachment plate. Test loads were derived from a platform flight weight, without ballast, of 1130 kg. Measurements from 64 strain gauges on the specimen are plotted and discussed. M.G.

N83-10039# Magrath (Howard A.), Dayton, Ohio.
EVALUATION REPORT: THE SPECIALISTS' MEETING ON DYNAMIC ENVIRONMENTAL QUALIFICATION TECHNIQUES
Howard A. Magrath AGARD Jul. 1982 33 p refs Sponsored by AGARD
(AGARD-AR-183) Avail: NTIS HC A03/MF A01

The blast pressures, from the muzzle of a gun from the properties of the propellant exhaust were determined. A theory which is based upon an analogy of gun blast with an explosive releasing energy at a constant rate and having strong directional effects due to the momentum of the propellant gas flow is extended. The apparent center of the explosion in the shock bottle is placed at a distance of about six gun calibers from the muzzles instead of at it. Pressure predictions based on this model agree well with experimental data for a 7.62 mm (30 caliber) rifle and a 27 mm aircraft gun. Gun blast measurements were also obtained experimentally on a surface near the gun muzzle. It was found that these can be predicted with reasonable accuracy if regular acoustic reflection occurs, but in the region of Mach reflection the agreement is poor particularly for small distances between the line of fire and the reflecting surface. Mach reflection occurs when the reflected waves tend to coalesce with the incoming waves. Under such circumstances the pressure on reflecting surfaces can be as high as four to eight times the pressure of the incident waves, instead of the usual pressure doubling on rigid surfaces that intercept acoustic waves. S.L.

N83-10238# Hughes Aircraft Co., Fullerton, Calif.
VIBRATION QUALIFICATION OF EQUIPMENT MOUNTED IN TURBOPROP AIRCRAFT
L. G. Smith *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 69-72 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 01/3

N83-10240# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
VIBRATION TEST LEVEL CRITERIA FOR AIRCRAFT EQUIPMENT
Preston S. Hall *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 81-91 refs Previously announced as N81-25070 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 01/3

N83-10270# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structures and Dynamics Div.
AIRCRAFT RESPONSE TO OPERATIONS ON RAPIDLY REPAIRED BATTLE DAMAGED RUNWAYS AND TAXIWAYS
Tony G. Gerardi and Lapsley R. Caldwell (Air Force Engineering and Services Center, Tyndall AFB, Fla.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 205-211 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 01/3

06 AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

For related information see also *19 Spacecraft Instrumentation* and *35 Instrumentation and Photography.*

N83-10040* National Aeronautics and Space Administration. Pasadena Office, Calif.
CAT ALTITUDE AVOIDANCE SYSTEM Patent
Bruce L. Gary, inventor (to NASA) (JPL, California Inst. of Technology, Pasadena) Issued 31 Aug. 1982 23 p Filed 12 Jan. 1981 Supersedes N81-16677 (19 - 07, p 0947) Sponsored by NASA
(NASA-Case-NPO-15351-1; US-Patent-4,346,595; US-Patent-Appl-SN-224231; US-Patent-Class-73-178R; US-Patent-Class-73-170R; US-Patent-Class-343-100ME; US-Patent-Class-374-122; US-Patent-Class-374-123) Avail: US Patent and Trademark Office CSCL 01D

A method and apparatus are provided for indicating the altitude of the tropopause or of an inversion layer wherein clear air turbulence (CAT) may occur, and the likely severity of any such CAT, includes directing a passive microwave radiometer on the aircraft at different angles with respect to the horizon. The microwave radiation measured at a frequency of about 55 GHz represents the temperature of the air at an "average" range of about 3 kilometers, so that the sine of the angle of the radiometer times 3 kilometers equals the approximate altitude of the air whose temperature is measured. A plot of altitude (with respect to the aircraft) versus temperature of the air at that altitude, can indicate when an inversion layer is present and can indicate the altitude of the tropopause or of such an inversion layer. The plot can also indicate the severity of any CAT in an inversion layer. If CAT has been detected in the general area, then the aircraft can be flown at an altitude to avoid the tropopause or inversion layer.
Official Gazette of the U.S. Patent and Trademark Office

N83-10041# Federal Aviation Administration, Atlantic City, N.J.
LIGHT AIRCRAFT PISTON ENGINE CARBURETOR ICE DETECTOR/WARNING DEVICE SENSITIVITY/EFFECTIVENESS Final Report, Jun. 1979 - Oct. 1981
William Cavage, James Newcomb, and Keith Biehl Jun. 1982 93 p
(FAA Proj. 184-32-130)
(AD-A117745; DOT/FAA/CT-82/44) Avail: NTIS HC A05/MF A01 CSCL 01/4

A comprehensive test cell data collection and evaluation effort

to review sensitivity and accuracy of 'off-the-shelf' carburetor ice detection/warning devices for general aviation piston engine aircraft was conducted. Presented herein are results, observations, and conclusions drawn from over 150 hours of test cell engine carburetor ice operations on a Teledyne Continental Motors 0-200A engine. Static sea level test cell engine operations were conducted to review carburetor ice detectors/warning devices sensitivty and accuracy during actual carburetor icing, determine internal carburetor ice accumulation locations, ascertain how ice formation propagates through the carburetor, observe carburetor performance during ice build-up and consider most advantageous location for a carburetor ice detector. Also presented is a review of the Federal Aviation Administration's carburetor accident/incident data relative to aircraft type, pilot qualifications, time of year and location by state where carburetor ice was a factor. Author (GRA)

N83-10042# Royal Australian Air Force, Edinburgh. Aircraft Research and Development Unit.
EVALUATION OF NEW IROQUOIS TORQUEMETER PN 73-30-1
L. R. Ward Jun. 1982 32 p refs
(AD-A117747; ARDU-TI-778; AR-002-491) Avail: NTIS HC A03/MF A01 CSCL 01/3

The purpose of this investigation was to supervise the installation of a prototype torquemeter in an Iroquois UH-1H and to evaluate the accuracy, damping, drift and ergonomic aspects of the new torquemeter. Tests showed that torquemeter accuracy was unacceptable and the indicating system was prone to significant drift. Tradesmen found adjustment of the 'zero set' difficult to perform due to poor access to the adjustment screw. Instrument markings in the range greater than 30 psi were obscured when viewed from the co-pilot's seat. The night-lighting of the instrument and the reflection characteristics of the glass cover were also unsatisfactory. The procedure for torquemeter adjustment for installed engine Data Plate Torque was found to be in error and a revised procedure is proposed. Several modifications to the instrument are recommended to be made before fleet-wide installation. A limited number of flight tests should be made to check that the production torquemeter and the new performance calculator are compatible. If significant delays occur before introduction of a suitable production torquemeter, an interim method of displaying maximum permissible torque is proposed. GRA

N83-10043# National Aerospace Lab., Amsterdam (Netherlands). Informatics Div.
ANALYSIS OF POSSIBLE INTERFERENCE IN RADIO ALTIMETERS INDUCED BY A POSITION MARKER SYSTEM CALLED RASP
O. B. M. Pietersen and F. Klinker 13 Nov. 1981 20 p refs
(NLR-TR-81135-U) Avail: NTIS HC A02/MF A01

A model which calculates the power ratio between the radio altimeter signal and the interfering RASP signal for normal RASP use (RASP antenna 80 m from runway) was developed. It is shown that the RASP signal is unlikely to cause significant interference in the radio altimeter if the aircraft is below 70 m, flying directly in front of the RASP antenna. For very poorly adjusted altimeters an equivalent minimum height of 30 m is found. At other points along the runway center line these values are higher. Author (ESA)

07 AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e.g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

For related information see also *20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-10044*# Pratt and Whitney Aircraft Group, East Hartford, Conn. Commercial Products Div.
DEVELOPMENT OF ADVANCED HIGH-TEMPERATURE HEAT FLUX SENSORS
W. H. Atkinson and R. R. Strange Sep. 1982 214 p refs
(Contract NAS3-22133)
(NASA-CR-165618; NAS 1.26:165618; PWA-5723-27) Avail: NTIS HC A10/MF A01 CSCL 21E

Various configurations of high temperature, heat flux sensors were studied to determine their suitability for use in experimental combustor liners of advanced aircraft gas turbine engines. It was determined that embedded thermocouple sensors, laminated sensors, and Gardon gauge sensors, were the most viable candidates. Sensors of all three types were fabricated, calibrated, and endurance tested. All three types of sensors met the fabricability survivability, and accuracy requirements established for their application. Author

N83-10045*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FURTHER INDUSTRIAL TESTS OF CERAMIC THERMAL BARRIER COATINGS
Curt H. Liebert and Stanley R. Levine Sep. 1982 10 p refs
(NASA-TP-2057; E-1184; NAS 1.60:2057) Avail: NTIS HC A02/MF A01 CSCL 21E

The NASA Lewis Research Center made technical assistance arrangements (contracts) with several commercial organizations under which Lewis designed plasma-sprayed thermal-barrier coatings (TBC) for their products. Lewis was then furnished with the test conditions and evaluations of coating usefulness. The coating systems were developed and sprayed at Lewis. All of the systems incorporated a two-layer, ceramic-bond coating concept. Coating thickness and chemical composition were varied to fit three applications: the leading edges of first-stage turbine vanes for an advanced gas turbine engine; the flame impingement surfaces of a combustor transition section; and diesel engine valves and head surfaces. The TBC incorporated yytria-stabilized zirconia, which lowered metal temperatures, protected metal parts, and increased metal part life. In some cases metal burning, melting, and warping were eliminated. Additional benefits were realized from these endeavors: hands-on experience with thermal-barrier coatings was provided to industry; the success of these endeavors encourages these and other organizations to accelerate the implementation of TBC technology. Author

N83-10046# General Motors Corp., Indianapolis, Ind.
LIFE UTILIZATION CRITERIA IDENTIFICATION IN DESIGN (LUCID) Final Report, Sep. 1978 - Dec. 1981
J. E. Holmes Wright-Patterson AFB, Ohio AFWAL Jun. 1982 68 p
(Contract F33615-78-C-2072; AF Proj. 3066)
(AD-A117807; AFWAL-TR-82-2039; EDR-10982) Avail: NTIS HC A04/MF A01 CSCL 21/5

LUCID has developed and demonstrated the capability to predict realistic engine usage during the conceptual design phase of a gas turbine design cycle. A method has been developed and demonstrated to include life and usage considerations as well as performance aspects in the process of selecting the optimal engine and aircraft definitions for an advanced military high performance application. This process also defines usage and life data for subsequent design and development efforts on the selected engine. These LUCID techniques allow trade-offs of engine life and performance parameters to be identified. Author (GRA)

N83-10247# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
ANALYSIS OF THE EFFECTS OF EXPLOSIVE FUEL IGNITION ON AN AIRCRAFT NOISE SUPPRESSOR SYSTEM
V. R. Miller, E. R. Hotz, and D. L. Brown *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 169-176 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 21/5

N83-10013# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE EFFECT OF THE STATOR WITH UNEQUAL PITCH CAS-

CADES ON THE COMPRESSOR BLADE VIBRATION
Zucchang Li *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 117-127 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 11 p Original language document announced as A82-22119 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

08 AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities; piloting; flight controls; and autopilots.

N83-10047*# Systems Technology, Inc., Mountain View, Calif.
AN ANALYSIS OF AIRLINE LANDING FLARE DATA BASED ON FLIGHT AND TRAINING SIMULATOR MEASUREMENTS Final Report
Robert K. Heffley, Ted M. Schulman, and Ted M. Clement Aug. 1982 117 p refs Revised
(Contract NAS1-10817)
(NASA-CR-166404; NAS 1.26:166404; STI-TR-1172-1R-Rev) Avail: NTIS HC A06/MF A01 CSCL 01C

Landings by experienced airline pilots transitioning to the DC-10, performed in flight and on a simulator, were analyzed and compared using a pilot-in-the-loop model of the landing maneuver. By solving for the effective feedback gains and pilot compensation which described landing technique, it was possible to discern fundamental differences in pilot behavior between the actual aircraft and the simulator. These differences were then used to infer simulator fidelity in terms of specific deficiencies and to quantify the effectiveness of training on the simulator as compared to training in flight. While training on the simulator, pilots exhibited larger effective lag in commanding the flare. The inability to compensate adequately for this lag was associated with hard or inconsistent landings. To some degree this deficiency was carried into flight, thus resulting in a slightly different and inferior landing technique than exhibited by pilots trained exclusively on the actual aircraft. Author

N83-10048*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
AN INTEGRATED USER-ORIENTED LABORATORY FOR VERIFICATION OF DIGITAL FLIGHT CONTROL SYSTEMS: FEATURES AND CAPABILITIES
P. deFeo, D. Doane, and J. Saito Aug. 1982 60 p refs
(NASA-TM-84276; A-9011; NAS 1.15:84276) Avail: NTIS HC A04/MF A01 CSCL 01C

A Digital Flight Control Systems Verification Laboratory (DFCSVL) has been established at NASA Ames Research Center. This report describes the major elements of the laboratory, the research activities that can be supported in the area of verification and validation of digital flight control systems (DFCS), and the operating scenarios within which these activities can be carried out. The DFCSVL consists of a palletized dual-dual flight-control system linked to a dedicated PDP-11/60 processor. Major software support programs are hosted in a remotely located UNIVAC 1100 accessible from the PDP-11/60 through a modem link. Important features of the DFCSVL include extensive hardware and software fault insertion capabilities, a real-time closed loop environment to exercise the DFCS, an integrated set of software verification tools, and a user-oriented interface to all the resources and capabilities. Author

N83-10049*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A PILOTED SIMULATOR INVESTIGATION OF STABILITY AND CONTROL, DISPLAY AND CREW-LOADING REQUIREMENTS FOR HELICOPTER INSTRUMENT APPROACH. PART 1: TECHNICAL DISCUSSION AND RESULTS
J. V. Lebacqz, R. D. Forrest (FAA, Moffett Field, Calif.), and R. M. Gerdes Sep. 1982 84 p refs
(NASA-TM-84258-Pt-1; A-9056-Pt-1; NAS 1.15:84258-Pt-1) Avail: NTIS HC A05/MF A01 CSCL 01C

A ground-simulation experiment was conducted to investigate the influence and interaction of flight-control system, fight-director display, and crew-loading situation on helicopter flying qualities during terminal area operations in instrument conditions. The experiment was conducted on the Flight Simulator for Advanced Aircraft at Ames Research Center. Six levels of control complexity, ranging from angular rate damping to velocity augmented longitudinal and vertical axes, were implemented on a representative helicopter model. The six levels of augmentation were examined with display variations consisting of raw elevation and azimuth data only, and of raw data plus one-, two-, and three-cue flight directors. Crew-loading situations simulated for the control-display combinations were dual-pilot operation (representative auxiliary tasks of navigation, communications, and decision-making). Four pilots performed a total of 150 evaluations of combinations of these parameters for a representative microwave landing system (MLS) approach task. Author

N83-10050*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A PILOTED SIMULATOR INVESTIGATION OF STABILITY AND CONTROL, DISPLAY AND CREW-LOADING REQUIREMENTS FOR HELICOPTER INSTRUMENT APPROACH. PART 2: SUPPORTING DATA
J. V. Lebacqz, R. D. Forrest (FAA, Moffett Field, Calif.), and R. M. Gerdes Sep. 1982 120 p
(NASA-TM-84258-Pt-2; A-9056-Pt-2; NAS 1.15:84258-Pt-2) Avail: NTIS HC A06/MF A01 CSCL 01C

Pilot rating comments and standard deviation measures of flight performance and control use are presented. N.W.

N83-10051*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A MATHEMATICAL MODEL OF A SINGLE MAIN ROTOR HELICOPTER FOR PILOTED SIMULATION
Peter D. Talbot, Bruce E. Tinling, William A. Decker, and Robert T. N. Chen Sep. 1982 52 p refs
(NASA-TM-84281; A-9033; NAS 1.15:84281) Avail: NTIS HC A04/MF A01 CSCL 01C

A mathematical model, suitable for piloted simulation of the flying qualities of helicopters, is a nonlinear, total force and moment model of a single main rotor helicopter. The model has ten degrees of freedom: six rigid body, three rotor flapping, and the rotor rotational degrees of freedom. The rotor model assumes rigid blades with rotor forces and moments radially integrated and summed about the azimuth. The fuselage aerodynamic model uses a detailed representation over a nominal angle of attack and sideslip range of + or - 15 deg., as well as a simplified curve fit at large angles of attack or sideslip. Stabilizing surface aerodynamics are modeled with a lift curve slope between stall limits and a general curve fit for large angles of attack. A generalized stability and control augmentation system is described. Additional computer subroutines provide options for a simplified engine/governor model, atmospheric turbulence, and a linearized six degree of freedom dynamic model for stability and control analysis. Author

N83-10052# Royal Aircraft Establishment, Farnborough (England).
SOME MEASUREMENTS OF WING BUFFETING ON A FLUTTER MODEL OF A TYPICAL STRIKE AIRCRAFT
D. G. Mabey and B. E. Cripps Jan. 1982 43 p refs
(RAE-TR-82007; RAE-Struct-BF/B/0893; BR83884) Copyright. Avail: NTIS HC A03/MF A01

Wing buffeting of an aeroelastic scale model was measured in the Mach number range 0.45 to 0.94 at Reynolds numbers from 600,000 to 1.7 million. Model suitability was examined. Wing rock started close to the maximum limit of buffet penetration achieved in flight. Significant variations were noted in aerodynamic damping with flow separations for both the low frequency roll mode and the higher frequency first wing bending mode. For the roll mode, these variations can be predicted by quasi-steady strip

theory, but not for the fundamental bending mode. The tests indicate limitations of buffeting measurements on wind tunnel models, particularly for half models. Author (ESA)

N83-10053# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
DIGITAL CALCULATION OF THE PROPAGATION IN TIME OF THE AIRCRAFT GUST RESPONSE COVARIANCE MATRIX
H. L. Jonkers, F. K. Kappetijn, and J. C. vanderVaart Sep. 1981 99 p refs
(VTH-LR-266) Avail: NTIS HC A05/MF A01

By basic principles of modern system theory, variances, or rms values of aircraft variables are calculated in the case where system dynamics and statistical properties of the disturbing signals, e.g., atmospheric turbulence, are a function of time. Properties of transient and steady state covariance response are summarized while the required format of aircraft and turbulence filter equations is given. Results are shown for numerical example of the symmetric motions of a jet transport in a coupled approach, followed by an automatic landing, the airplane being perturbed by Gaussian atmospheric turbulence. An example is also treated of transient variance response in which the variance overshoots the steady state value. The possible effects of the choice of initial conditions on the results of a stepwise covariance propagation calculation are elaborated. Author (ESA)

N83-10054# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France).
CRITERIA FOR HANDLING QUALITIES OF MILITARY AIRCRAFT
Jun. 1982 317 p refs Symp. held in Fort Worth, Colo., 19-22 Apr. 1982
(AGARD-CP-333; ISBN-92-835-0313-8) Avail: NTIS HC A14/MF A01

The status of flying qualities criteria for CTOL, V/STOL, and VTOL aircraft is reviewed and current and advanced flight control design techniques and handling quality requirements are examined with attention given to specifications for military aircraft. For individual titles, see N83-10055 through N83-10080.

N83-10055# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
PRESENT STATUS OF FLYING QUALITIES CRITERIA FOR CONVENTIONAL AIRCRAFT
David J. Moorhouse and Robert J. Woodcock *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 14 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The development of the U.S. military flying qualities specification up to MIL-F-8785B, issued in 1969 is reviewed and significant criteria proposed in the late 1960s and 70s many are discussed. The equivalent system approach was chosen for MIL-F-8785C and is discussed at length. Future requirements and developments in flying qualities criteria are examined. A.R.H.

N83-10056# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate.
STATUS OF VTOL AND VSTOL FLYING QUALITIES CRITERIA DEVELOPMENT: WHERE ARE WE AND WHERE ARE WE GOING?
John W. Clark, Jr. and Kevin W. Goldstein *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 18 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01 CSCL 01C

Over the past decade, a number of weaknesses and omissions were uncovered in the VSTOL and Helicopter Flying Qualities Specifications (MIL-F-83300 and MIL-H-8501A). Identification of these weaknesses spawned technology development in a number of areas. Both interim and final results in some of these areas, the status of existing data bases, and the future criteria development needs as perceived by the US Navy are presented. Specific areas addressed include: (1) information display and IMC (Instrument Meteorological Conditions) flight requirements; (2) criteria definition for highly augmented, multi-mode control schemes; (3) requirements unique to the small seaborne platform operational environment; and (4) requirements unique to varied rotor configurations. Both fixed-wing and rotary-wing criteria are considered. A.R.H.

N83-10057# McDonnell Aircraft Co., St. Louis, Mo.
EQUIVALENT SYSTEMS CRITERIA FOR HANDLING QUALITIES OF MILITARY AIRCRAFT
J. Hodgkinson *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 11 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01 CSCL 01C

Low order equivalent systems appear viable for mapping high order augmented systems into a lower dimensional form suitable for specifying flying qualities. Degrees of allowable mismatch between high and low order systems are defined in tentative new criteria. Alternative specification methods, such as the Neal-Smith method and the bandwidth method, are fundamentally similar to equivalent systems. Because the alternative methods involve mapping, they too exhibit mismatch. Author

N83-10058# British Aerospace Public Ltd. Co., Preston (England).
PILOTED HANDLING QUALITIES DESIGN CRITERIA FOR HIGH ORDER FLIGHT CONTROL SYSTEMS
John C. Gibson *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 15 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Several aircraft brought into service with 1970's utilize full authority fly-by-wire control systems. Such systems have not always reached their full potential to provide handling qualities superior to much simpler aircraft of the past. Sluggish response and pilot induced oscillations (PIO) in both pitch and roll axes typify the experience with a high proportion of FBW aircraft. The basic response characteristics of 'low order' aircraft (aircraft with insignificant control system dynamics) are reviewed and satisfactory ranges derived from in-flight experiments are presented. It is shown how 'high order' aircraft responses can be directly and simply related to "low order" requirements as expressed in MIL-F-8785. Several criteria are presented which permit adjustment of handling qualities for some specific tasks, including one assuring satisfactory control at touchdown. A.R.H.

N83-10059# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany). Aircraft Div.
GAIN AND PHASE MARGIN AS A BASIS OF LONGITUDINAL FLYING QUALITIES EVALUATION
W. Roeger and H. Beh *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 11 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

A criterion is presented that allows an evaluation of the longitudinal maneuvering characteristics of modern fighter aircraft. The required parameters are the 'gain margin' and the 'phase margin' of the frequency response characteristic of pitch attitude to control force. This criterion permits an evaluation of the dynamic characteristics as well as the steady-state and assumes that the pilot is always looking for a compromise between stability and response time. The criterion enables the estimation of PIO-tendencies, gives a survey about the influence of different parameters like time delay, lead time, natural frequency, damping ratio and the ratio of control force per normal load factor. The design of an advanced flight control system as an example illustrates the conformity of this criterion with MIL-F-8785. Author

N83-10060# Avions Marcel Dassault-Breguet Aviation, Saint-Cloud (France). Dept. Dynamique du Vol.
FLY BY WIRE CONTROL: TOWARDS NEW NORMS FOR JUDGING FLIGHT QUALITIES. AN EXAMPLE: THE MIRAGE 2000 [LES COMMANDES DE VOL ELECTRIQUES: VERS DE NOUVELLES NORMES DE JUGEMENT DES QUALITES DE VOL. UN EXEMPLE: LE MIRAGE 2000]

Paul-Louis Mathe *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 6 p In FRENCH (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Two fundamental objectives were met by selecting a strictly electric control system for the Mirage 2000 aircraft. The aircraft was made capable of flying in notably natural longitudinal instability conditions, and a significant step was taken in improving piloting qualities as compared with classical control methods. The direct and indirect advantages of suppressing the constraint of longitudinal stability in optimizing aerodynamics and in improving operational efficiency are examined. Transl. by A.R.H.

N83-10061# National Aerospace Lab., Amsterdam (Netherlands).
HANDLING QUALITIES OF TRANSPORTS WITH ADVANCED FLIGHT CONTROL SYSTEMS
H. A. Mooij and M. F. C. vanGool *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 15 p refs Sponsored by Netherlands Agency for Aerospace Programs and Dept. of Civil Aviation (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Adequate handling quality criteria applicable to system design as well as to airworthiness rule-making are required for the introduction of closed loop primary flight control systems when active control technology, particularly the relaxed static stability principle, is applied to future aircraft. Flight simulation and in-flight simulation using mathematical models of aircraft with rate command/attitude-hold primary flight control systems were performed for the approach and landing flight phase in order to generate data for criteria development. Configurations featuring in addition blended direct-lift control were evaluated as well. Based primarily on pilot ratings and commentary, boundaries between "satisfactory" and "acceptable" handling qualities (Cooper-Harper rating 3.5) were established for a number of criterion formats. While several criteria related to aircraft response are discussed for pitch and roll control, pilot-in-the-loop criteria are proposed for high-precision pitch attitude and altitude control tasks especially. A.R.H.

N83-10062# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany).
HANDLING QUALITIES CRITERIA FOR LONGITUDINAL CONTROL
W. Neuhuber, L. Diederich, and K. Brauser *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 15 p refs Prepared in cooperation with MBB, Munich (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Current specifications (e.g. MIL-F-8785) are not fully aplicable for augmented airplanes (high order systems). Major shortcomings are due to unsuitable mathematical representation of criteria. In addition current criteria are not precise enough, both for augmented and unaugmented systems. Detrimental effects to flying qualities are discussed. Means to reduce these effects are proposed, including nonlinear methods. With respect to the pitch short period a criterion (based on MIL-F-8785 and others) is presented, which states a more precise relationship between the relevant parameters. When transformed into time history and frequency response, this criterion is applicable for any system. It is shown that Nichols-plots can be a useful tool for handling qualities evaluation. Optimal stick force gradient criteria are derived from a quasi-linear pilot-aircraft closed loop analysis. The closed loop characteristics are formulated by means of a bandpass filter frequency response function, the characteristics of which are defined by the equivalent aircraft and a precision pilot model frequency function. Author

N83-10063# Systems Technology, Inc., Hawthorne, Calif.
BANDWIDTH: A CRITERION FOR HIGHLY AUGMENTED AIRPLANES
Roger H. Hoh, David G. Mitchell, and John Hodgkinson (McDonnell Aircraft Co., St. Louis) *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 11 p refs (For primary document see N83-10054 01-08)
(Contracts F33615-78-C-3615; F33615-80-C-3604)
Avail: NTIS HC A14/MF A01

A criterion to discriminate between desirable, acceptable, and unacceptable handling qualities for highly augmented airplanes is presented. The criterion is based on an old and well accepted idea; namely, that bandwidth is a key measure of the quality of an airplane's handling characteristics in a tight tracking situation. Correlations are made using recent experimental data for pitch attitude control. Possible shortcomings of the criterion are also discussed. Author

N83-10064# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany).
HANDLING QUALITIES ASPECTS OF CTOL AIRCRAFT WITH ADVANCED FLIGHT CONTROLS
D. Hanke, K. Wilhelm, and H.-H. Lange *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 17 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The problems which occur in applying the existing MIL-F-8785C short period frequency requirements to DLC enhanced aircraft in flight path control situations are described. It is indicated that the MIL-Spec. boundaries are only pitch related and not applicable to path control problems. A new generalized flight path control criterion is processed which considers the multiloop landing approach situation characterized by the pitch inner loop and the altitude outer loop. The criterion philosophy is based on the frequency separation of the two control loops necessary for good handling characteristics. The flight path to pitch attitude phase at the frequency of pilot closed inner loop was selected as criterion parameter in representing the pitch/heave harmony or loop separation. This phase criterion is suitable for conventional or DLC enhanced aircraft. It is shown that by using a rate command/attitude hold system to augment pitch inner loop the pilot exhibits discrete control behavior and open loop type control techniques. RC/AH systems lead to very low pilot activity and, combined with DLC, flight path control is improved. E.A.K.

N83-10065# Army Research and Technology Labs., Moffett Field, Calif. Aeromechanics Lab.
THE STATUS OF MILITARY HELICOPTER HANDLING QUALITIES CRITERIA
David L. Key *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 9 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Current helicopter specifications were assessed. It is indicated that MIL-F-83300 has clear advantages in its broad coverage of important handling qualities aspects and its systematic structure. Its disadvantages are that it is primarily based on V/STOL data, and explicit helicopter characteristics are only lightly covered. The deficiencies resulted in a major effort to develop a new specification containing mission oriented handling qualities requirements. A revised specification for adoption as MIL-H-8501B is planned. E.A.K.

N83-10066# Giravions Dorand Co., Suresnes (France).
THE IMPACT OF ACTIVE CONTROL ON HELICOPTER HANDLING QUALITIES
Marcel Kretz *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 10 p refs In FRENCH and in ENGLISH (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Changes have occurred in the concepts of controlling the working conditions of helicopter rotors. New trends, prompted by the techniques of active control applied to fixed wings, are oriented towards the automatic control of dynamic phenomena (vibration, instability) and aerodynamic phenomena (stall effects, interaction, gusting). The new trends feature frequency responses much wider than those of conventional autopilots, extending up to 30 Hz. Military helicopter design is much more demanding with regard to handling qualities: higher disk loading, NOE mission requirement, advent of advanced rotor aircraft concepts and a general broadening of the flight envelope. The impact of active control on handling

qualities and its benefits in their implementation are analyzed. It is concluded that present day control system limitations due to the use of monocyclic swashplate principles will have to be removed in the future by unconventional control systems based on multiloop self adaptive control resulting in higher order optimization of handling qualities. E.A.K.,

N83-10067# Army Air Corps, Stockbridge (England).
OPERATIONAL CRITERIA FOR THE HANDLING QUALITIES OF COMBAT HELICOPTERS
W. Steward *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 5 p ref (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

To minimize the threat from air and ground based weapon systems, combat helicopter operations require the use of concealed low level flight. The tasks facing the combat helicopter pilot during a typical antiarmor mission are discussed. Primary consideration is given to daylight operations in VMC, but the requirements for missions at night and in adverse weather, and for training are also addressed, together with the implications for handling qualities posed by the threat of armed helicopters in the air to air role. It is concluded that, by reducing the flying workload, assisting in the exploitation of maximum aircraft performance, and enhancing control accuracy, better handling qualities can contribute to improved operational effectiveness. E.A.K.

N83-10068# National Aeronautical Establishment, Ottawa (Ontario). Flight Research Lab.
FLIGHT EXPERIMENTS WITH INTEGRATED ISOMETRIC SIDE-ARM CONTROLLERS IN A VARIABLE STABILITY HELICOPTER
M. Sinclair *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 9 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The suitability of integrated, multiaxis, isometric controllers for use in helicopters were investigated. The 3 axis and 4 axis isometric side arm control configurations were flown successfully through a wide variety of demanding visual flight tasks and a brief instrument flight precision approach evaluation. The experimental tasks, the evaluated controller arrangements and the developed control laws are described, and the results of comparative assessments between isometric side arm control and conventional control arrangements are presented. E.A.K.

N83-10069# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
STABILITY AND CONTROL FOR HIGH ANGLE OF ATTACK MANEUVERING
W. Kraus, H. Przibilla, and U. Haux *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 11 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The possibilities of maneuvering a fighter aircraft at and beyond maximum lift were examined. On a delta canard configuration an optimum division of control devices for maximum control power at high angle of attack is shown and a special trim schedule gives best directional and lateral stability in this flight regime. The aircraft configuration was used for an air to air combat simulation. The control system layout at high incidence included thrust vectoring in pitch and yaw to support the aerodynamic control surfaces. Simulation results in terms of rates and accelerations in pitch, roll and yaw axis for a set of different poststall maneuvers shown that the aircraft is controllable and that active tactical maneuvers can be flown in this flight region. E.A.K.

N83-10070# British Aerospace Public Ltd. Co., Preston (England).
EXPERIENCE OF NON-LINEAR HIGH INCIDENCE AERODYNAMIC CHARACTERISTICS
D. Booker and K. McKay *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 5 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The impact of aerodynamic nonlinearities on aircraft behavior at high angle of attack from both an analytical and a flight test experience viewpoint was considered. The form of some of these nonlinearities and their importance to the design of high incidence control systems is examined. Considerations for the design of future military aircraft for operation at high angle of attack are suggested. E.A.K.

N83-10071# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
A COMPARISON OF ANALYTICAL TECHNIQUES FOR PREDICTING STABILITY BOUNDARIES FOR SOME TYPES OF AERODYNAMIC OR CROSS-COUPLING NONLINEARITIES
A. Jean Ross *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 12 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The need to predict stability boundaries for flight at high angles of attack and the possibility of using analytical techniques, rather than studying computed responses is discussed. Two analysis methods are described and compared, for particular forms of nonlinearities, and a relationship is established between nonlinear stability characteristics and linear stability boundaries in terms of the magnitudes of the response variables. The techniques are used to predict some of the flight characteristics likely to occur for a high incidence research model, which is tested to provide wind tunnel and free flight data for establishing mathematical models of aerodynamics at high angles of attack. E.A.K.

N83-10072# Calspan Advanced Technology Center, Buffalo, N.Y. Flight Research Dept.
EFFECT OF CONTROL SYSTEM DELAYS ON FIGHTER FLYING QUALITIES
Rogers E. Smith and Randall E. Bailey *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 16 p refs Sponsored by AFFDL (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The significant effects of time delay on fighter flying qualities, both longitudinal and lateral was confirmed. The flying qualities problems of latest fighter aircraft are most often related to the time delay which is introduced into the flight control system by the advanced, typically complex, control system design. Data from inflight simulators demonstrate this point. Typical sources of flight control system time delay and the methods of time delay measurement are reviewed. The application of several candidate flying qualities evaluation criteria or requirements, which are applicable to highly augmented fighter aircraft, is discussed. E.A.K.

N83-10073# Royal Netherlands Air Force, The Hague.
EFFECT OF CONTROL SYSTEM DELAYS ON FIGHTER FLYING QUALITIES
J. T. Bakker *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 3 p (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The effect of head up display (HUD) time delays on power approach handling qualities of the F-16 are discussed. Delays of 30 ms for the flight path marker presentation and of up to 50 ms in angle of attack presentation are observed. The effects of this 80 ms delay of F-16 handling during the approach, landing, and landing roll-out are considered. Modifications of the flight control system to correct the problem of nose-rise during roll-out and problems in the take off and landing phases are described. J.D.

N83-10074# Societe Nationale Industrielle Aerospatiale, Toulouse (France).
AN EXAMPLE OF LONGITUDINAL AND TRANSVERSAL OSCILLATION COUPLING: THE EPSILON AIRCRAFT CORK SCREW
J. Irvoas *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 13 p ref (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

A design analysis of the prototype EPSILON trainer aircraft is

presented. During test flights of the prototype aircraft a corkscrew oscillation, a combination of incidence oscillation and Dutch roll, was observed. Wind tunnel tests performed on models installed on a yaw-pitch head simulation by modeling with six degrees of freedom are described. A combined incidence oscillation and yawing criterion was derived. Determination of the structural causes of the corkscrew oscillation is described. Design modifications resulting from the design analysis were implemented, and successful flight tests of the preproduction aircraft performed. J.D.

N83-10075# Honeywell Systems and Research Center, Minneapolis, Minn.
ADVANCED FLIGHT CONTROL DESIGN TECHNIQUES AND HANDLING QUALITY REQUIREMENTS
Thomas B. Cunningham and Rhall E. Pope *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 13 p refs (For primary document see N83-10054 01-08)
(Contracts N00014-75-C-0144; ET-78-C-01-3391)
Avail: NTIS HC A14/MF A01

The application of control analysis and synthesis techniques in the frequency domain to the analysis of multi-input system performance and stability characteristics is described. A bandwidth hypothesis criterion is applied to specify handling qualities of 6 degrees of freedom systems. The control perspective for multi-input, multi-output systems is described. The use of linear quadratic Gaussian (LQG) design techniques to meet frequency design goals is discussed. These techniques are applied to the design of a YF-4 (F-4 with horizontal canards). J.D.

N83-10076# Societe Nationale Industrielle Aerospatiale, Toulouse (France).
ANALYZING THE ROLE OF CLOSED LOOP SYSTEMS FOR A SUBSONIC AIRCRAFT WITH REDUCED LONGITUDINAL STABILITY [ANALYSE DU ROLE DES ASSERVISSEMENTS POUR UN AVION SUBSONIQUE A STABILITE LONGITUDINALE REDUITE]
F. Iannarelli *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 15 p In FRENCH (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Introduced essentially to restore acceptable piloting qualities to centering in the rear, closed loop attitude control systems, thanks to their numerous possibilities, will finally by used to improve pilot comfort to the maximum. Both elementary closed loop systems (whose role is to modulate the position of fundamental points of the aircraft) and closed loop systems dictated by conditions (whose function is to assure the automatic trim of the aircraft or the maintenance of conditions) are discussed. These systems are adapted to an aircraft with reduced longitudinal stability such as the AIRBUS. Transl. by A.R.H.

N83-10077# Air Force Flight Test Center, Edwards AFB, Calif. Flight Test Technology Branch.
DEVELOPMENT OF HANDLING QUALITIES TESTING IN THE 70'S: A NEW DIRECTION
B. Lyle Schofield, Thomas R. Twisdale, William G. Kitto, and Tice A. Ashurst *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 16 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

An overview of the evolution of handling qualities testing at the Air Force Flight Test Center is presented, with emphasis on the significant changes which occurred during the 1970s. The System Identification and Tracking (SIFT) handling qualities test and evaluation techniques are discussed. Examples of SIFT test results are presented and discussed. J.D.

N83-10078# Bundesamt fuer Wehrtechnik und Beschaffung, Munich (West Germany).
EXPERIENCE WITH SYSTEM IDENTIFICATION FROM TRACKING (SIFT) FLIGHT-TEST-TECHNIQUES AT THE GERMAN AIR FORCE FLIGHT TEST CENTER
E. Buchacker *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 22 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

Pilot induced oscillations (PIO) which occured mainly during landing approach of a medium size cargo helicopter with a suspended load were investigated using SIFT techniques. The flight test program which was set up to gain insight into the problem is briefly described. Data evaluation showed that a bad combination of eigenfrequencies from a suspended load and the helicopter caused a very poorly damped eigenmode. This mode could be excited by the pilot but was not controllable for a human being because of the frequency (approximately 11 rad/sec) involved. A good correlation between pilot comments and flight test data evaluation was found. Author

N83-10079*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PREDICTION OF AIRCRAFT HANDLING QUALITIES USING ANALYTICAL MODELS OF THE HUMAN PILOT
Ronald A. Hess *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 8 p refs Document also announced as N82-24208 (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01 CSCL 01C

The optimal control model (OCM) of the human pilot is applied to the study of aircraft handling qualities. Attention is focused primarily on longitudinal tasks. The modeling technique differs from previous applications of the OCM in that considerable effort is expended in simplifying the pilot/vehicle analysis. After briefly reviewing the OCM, a technique for modeling the pilot controlling higher order systems is introduced. Following this, a simple criterion for determining the susceptibility of an aircraft to pilot-induced oscillations (PIO) is formulated. Finally, a model-based metric for pilot rating prediction is discussed. The resulting modeling procedure provides a relatively simple, yet unified approach to the study of a variety of handling qualities problems. Author

N83-10080# Calspan Advanced Technology Center, Buffalo, N.Y. Flight Research Dept.
SIMULATION FOR PREDICTING FLYING QUALITIES
Philip A. Reynolds *In* AGARD Criteria for Handling Qualities of Mil. Aircraft Jun. 1982 11 p refs (For primary document see N83-10054 01-08)
Avail: NTIS HC A14/MF A01

The role of in-flight simulation in predicting and reproducing flying qualities is discussed. Reliable flying qualities predictions can be difficult. Measuring workload is technically challenging. There are psychological and political pressures on the evaluation pilot. The variety of dynamics and the number of parameters involved in airplane flying qualities are large. The tasks are frequently difficult to accurately simulate on the ground. Examples from several airplane development programs are presented to illustrate some of the faulty predictions that have been made with ground simulators. These examples provide flying qualities situations that can be used for more formal comparisons of ground simulation with in-flight simulation and for developing general hypotheses which could then be tested. Modern in-flight simulation capability is discussed emphasizing model-following accuracy, model complexity, and special effects such as artificial crosswinds, turbulence, and ground effects. Cost effectiveness is addressed. A role complementary to ground simulation is seen for in-flight simulation. The improvement of simulation planning by performing these formal experiments to define the predictive value of various ground simulator features such as large motion and high-quality visual cues is suggested. Author

N83-10269# Royal Aircraft Establishment, Farnborough (England).
ANALYSIS OF SUBCRITICAL RESPONSE MEASUREMENTS FROM AIRCRAFT FLUTTER TESTS
J. C. Copley *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 199-211 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 01/3

09 RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways; aircraft repair and overhaul facilities; wind tunnels; shock tube facilities; and engine test blocks.

For related information see also *14 Ground Support Systems and Facilities (Space).*

N83-10081*# Southampton Univ. (England). Dept. of Aeronautics and Astronautics.
DESIGN OF A HORIZONTAL LIQUID HELIUM CRYOSTAT FOR REFRIGERATING A FLYING SUPERCONDUCTING MAGNET IN A WIND TUNNEL Progress Report, Jun. 1981 - Apr. 1982
Yu Yuan Wu Aug. 1982 65 p refs
(Grant NsG-7523)
(NASA-CR-165980; NAS 1.26:165980) Avail: NTIS HC A04/MF A01 CSCL 14B

The design of a horizontal liquid helium cryostat for refrigerating a flying superconducting magnet in a wind tunnel is presented. The basic principles of magnetic suspension theory are described and theoretical calculations of the superconducting magnet are provided. The experimental results of the boil-off of liquid nitrogen and liquid helium in the cryostat are reported. E.A.K.

N83-10082*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SENSITIVITY ANALYSIS OF COOL-DOWN STRATEGIES FOR A TRANSONIC CRYOGENIC TUNNEL
Jerry J. Thibodeaux Sep. 1982 31 p refs
(NASA-TM-84527; L-14366; NAS 1.15:84527) Avail: NTIS HC A03/MF A01 CSCL 14B

Guidelines and suggestions substantiated by real-time simulation data to ensure optimum time and energy use of injected liquid nitrogen for cooling the Langley 0.3-Meter Transonic Cryogenic Tunnel (TCT) are presented. It is directed toward enabling operators and researchers to become cognizant of criteria for using the 0.3-m TCT in an energy- or time-efficient manner. Operational recommendations were developed based on information collected from a validated simulator of the 0.3-m TCT and experimental data from the tunnel. Results and trends, however, can be extrapolated to other similarly constructed cryogenic wind tunnels. Author

N83-10083# Transportation Systems Center, Cambridge, Mass.
AIRPORT LANDSIDE. VOLUME 1. PLANNING GUIDE Final Report, Jan. 1978 - Sep. 1980
L. McCabe and M. Gorstein Jun. 1982 78 p refs 5 Vol.
(AD-A117599; DOT-TSC-FAA-82-4-1; FAA-EM-80-8-1) Avail: NTIS HC A05/MF A01 CSCL 01/5

This volume describes a methodology for performing airport landside planning by applying the Airport Landside Simulation Model (ALSIM) developed by TSC. For this analysis, the airport landside is defined as extending from the airport boundary to the aircraft gate. The model routes simulated enplaning and deplaning passenger groups through a series of essential processing facilities. At the simulated facilities, queueing and service processes are modeled. Flow, queueing time, queue length, and occupancy statistics are produced. The guide describes how the model output may be applied to a landside capacity analysis. It also discusses using the model for management of daily operations and airport design. A description of input data necessary for model operation is presented with examples using data from Miami, Denver, and La Guardia airports. GRA

N83-10084# Transportation Systems Center, Cambridge, Mass.
AIRPORT LANDSIDE. VOLUME 2. THE AIRPORT LANDSIDE SIMULATION MODEL (ALSIM) DESCRIPTION AND USERS GUIDE Final Report, Jan. 1978 - Sep. 1980
L. McCabe and M. Gorstein Jun. 1982 101 p 5 Vol.
(AD-A117600; DOT-TSC-FAA-82-4-2; FAA-EM-80-8-2) Avail: NTIS HC A06/MF A01 CSCL 01/5

This volume provides a general description of the Airport Landslide Simulation Mode. A summary of simulated passenger and vehicular processing through the landslide is presented. Program operating characteristics and assumptions are documented and a complete description of the input data required for simulation operation is furnished. Model outputs necessary for analysis of landslide congestion include flow, queue length, queueing time and occupancy. Summaries of values of these parameters, obtained from a simulation run, are shown as examples. Time series of flow and queue length produced during the simulation run are also exhibited. GRA

N83-10085# Transportation Systems Center, Cambridge, Mass.
AIRPORT LANDSIDE. VOLUME 3. ALSIM CALIBRATION AND VALIDATION Final Report, Jan. 1978 - Sep. 1980
L. McCabe and M. Gorstein Jun. 1982 209 p 5 Vol.
(AD-A117601; DOT-TSC-FAA-82-4-3; FAA-EM-80-8-3) Avail: NTIS HC A10/MF A01 CSCL 01/5

This volume discusses calibration and validation procedures applied to the Airport Landside Simulation Model (ALSIM), using data obtained at Miami, Denver and La Guardia Airports. Criteria for the selection of a validation methodology are described. The chosen methodology consists of two parts: (1) plotted comparisons of ALSIM output and corresponding field data; and (2) a hypothesis test based upon the probability of occurrence of field data within two simulated standard deviations of the simulated mean at each time point. Five simulation runs with different random number streams were used to produce time series of flow and queue length data at landside processors selected for comparison. Mean values and standard deviations were obtained at each time point for plotted and statistical comparison. Results are displayed in this volume. Satisfactory results were obtained at security stations, parking facility exits, customs and immigration. Ticket counter and curbside facilities failed to display good agreement. Gates, bagclaim areas and car rental counters were not compared for reasons specified in the report. GRA

N83-10086# Transportation Systems Center, Cambridge, Mass.
AIRPORT LANDSIDE. VOLUME 4. APPENDIX A. ALSIM AUXILIARY AND MAIN PROGRAMS Final Report, Jan. 1978 - Sep. 1980
L. McCabe and M. Gorstein Jun. 1982 279 p 5 Vol.
(AD-A117602; DOT-TSC-FAA-82-4-4; FAA-EM-80-8-4) Avail: NTIS HC A13/MF A01 CSCL 01/5

This Appendix describes the Program Logic of the Airport Landside Simulation Model (ALSIM) AUXILIARY and MAIN Programs. Both programs are written in GPSS-V. The AUXILIARY program is operated prior to the MAIN Program to create GPSS transactions representing Enplaning Passenger groups from the input flight schedule. The transactions are written on a JOBTAPE file for subsequent use by the MAIN program. The MAIN Program creates greeter and deplaning passenger transactions and enacts the movements of all passengers and visitors through the landside. GRA

N83-10087# Transportation Systems Center, Cambridge, Mass.
AIRPORT LANDSIDE. VOLUME 5. APPENDIX B. ALSIM SUBROUTINES Final Report, Jan. 1978 - Sep. 1980
L. McCabe and M. Gorstein Jun. 1982 321 p 5 Vol.
(AD-A117603; FAA-EM-80-8-5; DOT-TSC-FAA-82-4-5) Avail: NTIS HC A14/MF A01 CSCL 01/5

This Appendix describes the operation of ten subroutines used to support the AUXILIARY and MAIN programs of ALSIM. Flow charts and listings of all programs are provided. The major portion describes the FORTRAN subprogram FORTM which is used to read input data, assign values to matrix elements, perform matrix searches and assign parameters to GPSS transactions during simulation model execution. Six other subroutines, mostly written in IBM System/370 Assembly Language, are used in the initialization phase of the simulation to link FORTM to the MAIN program and to provide an in-core read and write capability. Two additional assembly language subroutines and a FORTRAN subroutine are

used during simulation of the airport landside. The first assembly language subroutine assigns the number of passenger bags to be retrieved by the deplaning passenger transaction and generates random numbers to simulate waiting times at the bag claim facility. The second subroutine performs the same function as ASSIGN and LOGIC blocks of GPSS, but is FORTRAN callable. The FORTRAN subroutine of this group detects argument errors of the previous subroutine and prints error messages. GRA

N83-10088# Sandia Labs., Albuquerque, N. Mex. Thermomechanical and Physical Div.
PROGRAM TO PREDICT PERFORMANCE OF A GAS GUN
Robert D. Hardy Dec. 1981 35 p refs
(Contract DE-AC04-76DP-00789)
(DE82-007644; SAND-81-2546) Avail: NTIS HC A03/MF A01

A program which runs in SPS Basic on the PDP-11 computer has been written to maintain a performance data file for the 100 mm single-stage compressed light gas gun. This program can be used to update the master file which is located on a floppy disk by adding recent shot data. It will also perform a third-order least-square fit to the data to determine the gas load for a specified projectile weight and velocity. DOE

N83-10089# National Academy of Sciences - National Research Council, Washington, D. C. Evaluation Panels.
AN EVALUATIVE REPORT ON THE NATIONAL MEASUREMENT LABORATORY, NATIONAL BUREAU OF STANDARDS, FISCAL YEAR 1981 Final Report
Dec. 1981 137 p
(Contract EO-A01-78-00-3501)
(PB82-197039) Avail: NTIS HC A08/MF A01 CSCL 14B

The technical functions and operations are reviewed. Importance and relative priority of projects, quality of staff, equipment needs, finances, and the relation of the program to the mission of the Bureau are considered. A continuing contact between the scientists and engineers of the academic and industrial communities and the Bureau staff is provided. GRA

N83-10090# National Academy of Sciences - National Research Council, Washington, D. C. Evaluation Panels.
AN EVALUATIVE REPORT ON THE NATIONAL ENGINEERING LABORATORY, NATIONAL BUREAU OF STANDARDS, FISCAL YEAR 1981 Final Report
Jan. 1982 73 p
(Contract EO-A01-78-00-3501)
(PB82-197047) Avail: NTIS HC A04/MF A01 CSCL 14B

An evaluation of the technical functions and programs of the National Engineering Laboratory (NEL), one of the major organizational units of the National Bureau of Standards is presented. It represents the work of seven Panels. One of the Panels is for the NEL as a whole and performs an overview function for the Academy. The other six Panels review specific activities within NEL. Author

N83-10245# Naval Surface Weapons Center, White Oak, Md.
EDESS: AN ELECTROMAGNETICALLY-DRIVEN EXPLOSIVE-SHOCK SIMULATOR
F. J. Sazama and J. B. Whitt *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 137-147 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/2

12 ASTRONAUTICS (GENERAL)

For extraterrestrial exploration see *91 Lunar and Planetary Exploration.*

N83-10091*# Puerto Rico Univ., Mayaguez. Dept. of Mechanical and Nuclear Engineering.
FLUID DYNAMIC AND THERMODYNAMIC ANALYSIS OF A MODEL PERTAINING TO CRYOGENIC FLUID MANAGEMENT IN LOW GRAVITY ENVIRONMENTS FOR A SYSTEM WITH DYNAMICALLY INDUCED SETTLING Final Report
Joe Rios Jul. 1982 80 p refs
(Contract NAS9-16549)
(NASA-CR-167736; NAS 1.26:167736) Avail: NTIS HC A05/MF A01 CSCL 22A

The settling behavior of the liquid and gaseous phases of a fluid in a propellant and in a zero-g environment, when such settling is induced through the use of a dynamic device, in this particular case, a helical screw was studied. Particular emphasis was given to: (1) the description of a fluid mechanics model which seems applicable to the system under consideration, (2) a First Law of Thermodynamics analysis of the system, and (3) a discussion of applicable scaling rules. Author

N83-10092*# Grumman Aerospace Corp., Bethpage, N.Y.
MANNED GEOSYNCHRONOUS MISSION REQUIREMENTS AND SYSTEMS ANALYSIS STUDY ADD-ON Final Briefing
Stanley W. Sherman, Wesley T. Johnson, and William C. Schoen Jul. 1982 263 p
(Contract NAS9-15779)
(NASA-CR-167741; NAS 1.26:167741) Avail: NTIS HC A12/MF A01 CSCL 22A

An MOTV mission model was constructed in order to establish the baseline condition for SOC basing. A mission model to reflect satellite servicing was extended. Yearly traffic was projected. Driver missions were categorized. Cost trades and sensitivity to traffic rates were performed and service equipment needs were identified. S.L.

N83-10093*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
EXOTHERMIC FURNACE MODULE DEVELOPMENT
Roy R. Darnell and Richard M. Poorman Sep. 1982 14 p
(NASA-TM-82500; NAS 1.15:82500) Avail: NTIS HC A02/MF A01 CSCL 22A

An exothermic furnace module was developed to rapidly heat and cool a 0.820-in. (2.1 cm) diameter by 2.75-in. (7.0 cm) long TZM molybdenum alloy crucible. The crucible contains copper, oxygen, and carbon for processing in a low-g environment. Peak temperatures of 1270 C were obtainable 3.5 min after start of ignition, and cooling below 950 C some 4.5 min later. These time-temperature relationships were conditioned for a foam-copper experiment, Space Processing Applications Rocket experiment 77-9, in a sounding rocket having a low-g period of 5 min. M.G.

N83-10094*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
TOLERANCE REQUIREMENTS TO PREVENT FLUID LEAKAGE IN THE CRUCIBLE/PLUNGER MEA EXPERIMENT MPS 770030
Thomas J. Rathz Aug. 1982 27 p refs
(NASA-TM-82497; NAS 1.15:82497) Avail: NTIS HC A03/MF A01 CSCL 22A

Molten Al-In leaked unexpectedly out of the crucible of a proposed MEA materials processing in space experiment. The molten metals use a spring loaded plunger to eliminate most free surfaces. The critical criteria necessary to initiate flow and the rate of fluid flow into the crucible/plunger annulus is calculated. Experimental in situ X-radiographs are interpreted according to the calculations. A note on possible effects of capillary flow if wetting occurs between crucible/plunger and liquids is included. A.R.H.

13 ASTRODYNAMICS

Includes powered and free-flight trajectories; and orbit and launching dynamics.

No abstracts in this category.

14 GROUND SUPPORT SYSTEMS AND FACILITIES (SPACE)

Includes launch complexes, research and production facilities; ground support equipment, mobile transporters; and simulators.

For related information see also *09 Research Support Facilities (Air).*

No abstracts in this category.

15 LAUNCH VEHICLES AND SPACE VEHICLES

Includes boosters; manned orbital laboratories; reusable vehicles; and space stations.

N83-10095*# National Aeronautics and Space Administration, Washington, D. C.
POST LAUNCH REPORT ON THE HEAT CAPACITY MAPPING MISSION
8 Oct. 1982 25 p refs
(NASA-TM-84859; E-651-78-01; NAS 1.15:84859) Avail: NTIS HC A02/MF A01 CSCL 22A

The heat capacity mapping mission (HCMM) is reviewed. Launch and early flight operation, final orbit and ground coverage, orbital maintenance, the science instrument and data, spacecraft attitude, command and telemetry, thermal, and power systems and end-of-life tests are summarized. Geological surveys, agriculture, geology, hydrology, surface temperature mapping, soil to agriculture, meteorology/climatology, information techniques, evapotranspiration, snowmelt runoff, and satellite infrared radiometer calibration are areas for which results are discussed. N.W.

N83-10096# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
PASSIVE STABILIZATION OF SATELLITES BY GRAVITY GRADIENT
Joao Ricardo de Freitas Oliveira and Santiago Alves Tavares Jul. 1982 8 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Brazil. Congr. on Automation, Sao Paulo, Brazil, 14-17 Sep. 1982
(INPE-2462-PRE/154) Avail: NTIS HC A02/MF A01

The stabilization of a rigid satellite by gravity gradient was studied. The Hamiltonian formalism to get the equations of motion was used. The stability analysis was performed by two different techniques: the Liapunov's direct method and the linearization of the equations of motion for small angles. In order to accomplish the computer simulations, to obtain practical results, a specific geometry for the satellite was used. From these simulations, equipotential curves that provide the bounds of libration were obtained. A brief analysis of the perturbations working on the system was also made. Author

N83-10097*# National Aeronautics and Space Administration, Washington, D. C.
MISSION OPERATION REPORT. RCA-E/DELTA LAUNCH
1982 29 p
(NASA-TM-84869; M-492-206-82-06; NAS 1.15:84869) Avail: NTIS HC A03/MF A01 CSCL 22A

A high traffic capacity, 24 transponder communicates satellite, RCA E, is scheduled to be launched on a Delta 3924 launch vehicle. The vehicle configuration places the spacecraft in a synchronous transfer orbit. Three days after launch, the spacecraft apogee kick motor will be fired at transfer orbit to circularize its orbit at geosynchronous altitude of 19,300 NM above the equator at approximately 128 degrees W longitude where it will service commercial and government voice digital, and video communications requirements between Alaska and CONUS. S.L.

N83-10098# Lincoln Lab., Mass. Inst. of Tech., Lexington.
GROUND-BASED ELECTRO-OPTICAL DETECTION OF ARTIFICIAL SATELLITES IN DAYLIGHT FROM REFLECTED SUNLIGHT
Eugene W. Rork, Shaoann S. Lin, and Anthony J. Yakutis 25 May 1982 56 p refs
(Contract F19628-80-C-0002; AF Proj. 2698; AF Proj. 2295)
(AD-A117413; ETS-63) Avail: NTIS HC A04/MF A01 CSCL 22/3

An electro-optical sensor consisting of the ETS 31-inch f/5 telescope, a readily-available silicon vidicon TV camera, and a video signal processing system was used to acquire and track low altitude satellites in daylight from reflected sunlight. The limiting magnitude was 8m3. In demonstrating this, a total of 20 satellite tracks on 18 different satellites was achieved in full daylight during one day, and accurate precision positional data on 13 of the tracks were sent to the NORAD Space Defense Center. This demonstrated proof-of-concept might provide an enhanced GEODSS daylight operation. In connection with experiments in daylight space surveillance, an atmospheric phenomenon was encountered which consists primarily of point images, apparently windblown, moving through the field-of-view. The leading candidates are seed vehicles, insects, and ice crystals. A parallax technique has been demonstrated to separate these objects, dubbed 'angels,' from artificial satellites. GRA

N83-10099# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN INFORMAL DISCUSSION CONCERNING GEOSYNCHRONOUS COMMUNICATION SATELLITES
Yi Yuanjian 21 Jun. 1982 10 p refs Transl. into ENGLISH from Hangkong Zhishi (China), no. 5, 1981 p 22-23
(AD-A117546; FTD-ID(RS)T-0517-82) Avail: NTIS HC A02/MF A01 CSCL 22/3

The nature of a geostationary orbit and techniques required for launching a satellite into such an orbit are explained as well as principles used for spin stabilization, spin reduction, and attitude control. Ground communication facilities and communications equipment carried on geosynchronous satellites are also discussed. A.R.H.

N83-10100# Centre National d'Etudes Spatiales, Toulouse (France). Centre Spatiale.
PERFORMANCE-COST ANALYSIS OF A LARGE PROGRAM: THE CASE OF ARIANE [ANALYSE PERFORMANCE. COUTS D'UN GRAND PROGRAMME: LE CAS ARIANE]
Claude Petitdemange Jun. 1982 196 p In FRENCH; ENGLISH summary
(CNES-NT-103) Avail: NTIS HC A09/MF A01

The adapting of present day methods for organizing and controlling large programs to a new philosophy, involving not only keeping to given budget, but also the production of a competitive product, is studied. The Ariane program (financing, running, control of the different phases, contractual organization, etc) is analyzed. The different phases of the design-to-cost procedure employed, are enumerated. It is concluded that the sequential looped planning currently applied can be improved by integrating specific parameters and updating them when necessary. This should be done at each stage although it should always be possible to return to the initial conditions. Author (ESA)

N83-10101# Messerschmitt-Boelkow-Blohm G.m.b.H., Ottobrunn (West Germany). Space Div.
STUDY AND DETAILED DEFINITION OF MODULAR DIGITAL ATTITUDE CONTROL SYSTEM (MACS) Final Report
K. Fetzer, A. Grundmann, H. Bittner, H. Hufnagel, B. Moeckl, J. Starke, G. Stich, F. Krutzen (Hollandse Signaalapparaten B.V.), and H. Lamberts (Hollandse Signaalapparaten B.V.) Paris ESA 20 Apr. 1982 348 p
(Contracts ESTEC-4581/81/NL-AK(SC); MBB-R4000-2594R)
(ESA-CR(P)-1614) Avail: NTIS HC A15/MF A01

Operational requirements, derived from a variety of present and future satellite missions, and the transformation of these

requirements into computer specific tasks were considered. As a main result, onboard data handling through the MACS bus was defined. The derived requirements were applied to existing bus systems. Since no candidate proved to be in satisfactory compliance with desired system performance, alternative solutions were proposed and evaluated. The most promising system concept is described on a system level, covering hardware as well as software. The MACS bus is specified in detail. Author (ESA)

N83-10102# Societe Nationale Industrielle Aerospatiale, Paris (France).
ANTITANK MISSILES NIGHT FIRING FROM AEROSPATIALE HELICOPTERS
G. deWinter 1982 18 p Presented at Assoc. Aeron. et Astronautique de France (AAAF) 8th European Rotorcraft Forum, Aix-en-Provence, 31 Aug.-3 Sep. 1982
(SNIAS-822-320-101; Paper-12.4) Avail: NTIS HC A02/MF A01

A day/night firing system for HOT antitank missiles was developed and mounted on a HAC/PAH2 helicopter, equipped with a suitably adapted sight. Night fighting requirements for a helicopter that is armed with antitank missiles are recalled. The selection of a sensor is discussed. The design of a platform in order to fulfill the observation and firing mission is described. Night antitank action is analyzed. Characteristics of a thermal imager which solves the identified problems of night firing are given. Author (ESA)

N83-10268# Westinghouse Research and Development Center, Pittsburgh, Pa.
LATERAL DYNAMICS OF C4 MISSILE
F. H. Wolff *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 189-198 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 22/2

16 SPACE TRANSPORTATION

Includes passenger and cargo space transportation e.g., shuttle operations; and rescue techniques.

For related information see also *03 Air Transportation and Safety* and *85 Urban Technology and Transportation.*

N83-10103*# National Aeronautics and Space Administration, Washington, D. C.
STS-4 TEST MISSION SIMULATES OPERATIONAL FLIGHT: PRESIDENT TERMS SUCCESS GOLDEN SPIKE IN SPACE
1982 4 p
(NASA-TM-84866; MR-004; NAS 1.15:84866) Avail: NTIS HC A02/MF A01 CSCL 22A

The fourth Space Shuttle flight is summarized. STS certification as operational, applications experiments, experiments involving crew, the first Getaway Special, a lightning survey. Shuttle environment measurement, prelaunch rain and hail, loss of solid rocket boosters, and modification of the thermal test program are reviewed. N.W.

N83-10104*# National Aeronautics and Space Administration, Washington, D. C.
COLUMBIA'S SECOND MISSION. STS-2, THE FIRST FLIGHT OF A USED SPACECRAFT
[1982] 4 p
(NASA-TM-84865; NAS 1.15:84865; MR-002) Avail: NTIS HC A02/MF A01 CSCL 22A

A short description of the Space Shuttle Orbiter Columbia's second orbital test flight is presented. Included are discussions of the robot arm tests, Earth survey experiments, as well as the problems encountered. L.F.M.

N83-10105*# National Aeronautics and Space Administration, Washington, D. C.
STS-3, BUSIEST AND MOST SUCCESSFUL TEST MISSION
1982 4 p
(NASA-TM-84864; NAS 1.15:84864; MR-003) Avail: NTIS HC A02/MF A01 CSCL 22A

A short description of the Space Shuttle Orbiter Columbia's third orbital test flight is presented. Included are discussions of the space science mission, medical and materials processing experiments, as well as the minor problems encountered. L.F.M.

N83-10106*# National Aeronautics and Space Administration, Washington, D. C.
A FREE PEOPLE CAPABLE OF GREAT DEEDS, THE STORY OF STS-1, THE FIRST SPACE SHUTTLE MISSION
1981 4 p
(NASA-TM-84863; NAS 1.15:84863) Avail: NTIS HC A02/MF A01 CSCL 22A

The STS-1 mission of the space shuttle is discussed. The launch and orbital operations are described, and the landing is reviewed. S.L.

N83-10107# Committee on Science and Technology (U. S. House).
FLIGHT OF STS-4 WITH ASTRONAUTS CAPTAIN T. KEN MATTINGLY AND HENRY HARTSFIELD
Washington GPO 1982 25 p Hearings before the Comm. on Sci. and Technol., 97th Congr., 2d Sess., No. 109, 28 Jul. 1982 (GPO-97-828) Avail: Committee on Science and Technology

Congratulatory remarks made to the crew of the last of the orbital flight tests of the space shuttle Columbia are presented along with responses offered by the Deputy Director of NASA and the flight commander and pilot. Questions raised and answers provided regarding systems performance, experiment operation, operational problems, physiological effects, and Earth observations are included. A.R.H.

N83-10108*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ATMOSPHERIC ENVIRONMENT FOR SPACE SHUTTLE (STS-4) LAUNCH
D. L. Johnson, C. K. Hill, and G. W. Batts (Computer Sciences Corp., Huntsville, Ala.) Jul. 1982 51 p refs
(NASA-TM-82498; NAS 1.15:82498) Avail: NTIS HC A04/MF A01 CSCL 22A

Selected atmospheric conditions observed near space shuttle STS-4 launch time on June 27, 1982, at Kennedy Space Center, Florida are summarized. Values of ambient pressure, temperature, moisture, ground winds, visual observations (cloud), and winds aloft are included. The sequence of prelaunch Jimsphere measured vertical wind profiles is given as well as the wind and thermodynamic parameters measured at the surface and aloft in the SRB descent/impact ocean area. Final meteorological tapes, which consist of wind descent were constructed. The STS-4 ascent meteorological data tape was constructed by Marshall Space Flight Center in response to shuttle task agreement No. 989-13-22-368 with Johnson Space Center. A.R.H.

17 SPACECRAFT COMMUNICATIONS, COMMAND AND TRACKING

Includes telemetry; space communications networks; astronavigation; and radio blackout.

For related information see also *04 Aircraft Communications and Navigation* and *32 Communications.*

No abstracts in this category.

18 SPACECRAFT DESIGN, TESTING AND PERFORMANCE

Includes spacecraft thermal and environmental control; and attitude control.

For life support systems see *54 Man/System Technology and Life Support.* For related information see also *05 Aircraft Design, Testing and Performance* and *39 Structural Mechanics.*

N83-10109*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
PRELIMINARY ANALYSIS OF STS-4 ENTRY FLIGHT DATA Final Report
Sep. 1982 93 p refs
(NASA-TM-81375; NAS 1.15:35457) Avail: NTIS HC A05/MF A01 CSCL 22A

A preliminary analysis of the data obtained during entry of the STS-4 Flight was completed. Planned maneuvers were flown during this flight to increase the quality of stability and control analysis, similar to the techniques used during STS-3. The derivatives obtained from STS-4 agreed fairly well with the derivatives obtained on previous flights. The dependence of aileron effectiveness on a elevon position above a Mach number of 10 seen on STS-3 was conclusively verified on STS-4. CSS Mode was engaged to fly the heading alignment circle. After engagement, several cycles of a low amplitude pilot induced oscillation (1 deg/sec) at about 0.3 hertz can be seen. No PIO suppressor activity was seen between preflare and touchdown. This approach demonstrates the advantage of the shallow final glideslope approach. In this type of approach, the pilot is not required to make accurate altitude judgments since an acceptable landing can be made without performing the final flare. Author

N83-10110*# Old Dominion Univ., Norfolk, Va.
ATTITUDE AND VIBRATION CONTROL OF A LARGE FLEXIBLE SPACE-BASED ANTENNA
S. M. Joshi Aug. 1982 32 p refs
(Grant NAG1-102)
(NASA-CR-165979; NAS 1.26:165979) Avail: NTIS HC A03/MF A01 CSCL 22B

Control systems synthesis is considered for controlling the rigid body attitude and elastic motion of a large deployable space-based antenna. Two methods for control systems synthesis are considered. The first method utilizes the stability and robustness properties of the controller consisting of torque actuators and collocated attitude and rate sensors. The second method is based on the linear-quadratic-Gaussian control theory. A combination of the two methods, which results in a two level hierarchical control system, is also briefly discussed. The performance of the controllers is analyzed by computing the variances of pointing errors, feed misaligment errors and surface contour errors in the presence of sensor and actuator noise. S.L.

N83-10111# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
ACTIVE CONTROL OF SPACE STRUCTURES (ACOSS) ELEVEN Interim Report, May - Nov. 1981
Keto Soosaar, Thomas H. Brooks, Virenda N. Mahajan, Jiguan C. Lin, Glen J. Kissell, Daniel R. Hegg, Ronald K. Pearson, James D. Turner, Hon M. Chun, and Eliezer Foger Griffiss AFB, N.Y. RADC May 1982 140 p refs 2 Vol.
(Contract F30602-81-C-0180)
(AD-A117596; CSDL-R-1536; RADC-TR-82-131-Vol-2) Avail: NTIS HC A07/MF A01 CSCL 17/8

Spacecraft control theory is investigated. The selection process necessary in large space structure control system design using a truncated finite element model is described. The truncated model must be selected properly and compensated explicitly for control and observation spillover, so the control system designed through this method can perform satisfactorily when implemented on the structure. Proper selection requires correct classification of structural modes into primary and secondary modes. Explicit compensation for truncation includes: placement of actuators and sensors, synthesis of the actuator and sensor influences once they are placed on the structure, and filtering of the actuator inputs and sensor outputs. Computer aided design software and acceleration output feedback control are also discussed. GRA

N83-10112# Draper (Charles Stark) Lab., Inc., Cambridge, Mass.
ACOSS ELEVEN (ACTIVE CONTROL OF SPACE STRUCTURES), VOLUME 1 Interim Report, May - Nov. 1981
Thomas H. Brooks, Virenda N. Mahajan, Jiguan G. Lin, Glenn J. Kissell, Daniel R. Hegg, Ronald K. Pearson, James D. Turner, Hon M. Chun, and Eliezer Foger Griffiss AFB, N.Y. RADC May 1982 33 p ref 2 Vol.
(Contract F30602-81-C-0180; ARPA Order 3655)
(AD-A117595; CSDL-R1536-Vol-1; RADC-TR-82-131-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 17/8

The Active Control of Space Structures (ACOSS) Eleven contract includes three distinct areas of endeavor: Simulations Extensions, HALO Optics and ACOSS. This report covers the work performed in each of these areas between May and November 1981. Simulations Extension and HALO Optics are presented in Volume 1 and ACOSS is presented in Volume 2. Author (GRA)

N83-10236# RCA Astro-Electronics Div., Princeton, N. J.
SPACECRAFT MODAL TESTING USING SYSTEMATIC MULTI-SHAKERS SINE-DWELL TESTING TECHNIQUES
F. H. Chu, C. Voorhees, W. W. Metzger, and R. Wilding *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 41-58 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 22/2

19 SPACECRAFT INSTRUMENTATION

For related information see also *06 Aircraft Instrumentation* and *35 Instrumentation and Photography.*

No abstracts in this category.

20 SPACECRAFT PROPULSION AND POWER

Includes main propulsion systems and components e.g., rocket engines; and spacecraft auxiliary power sources.

For related information see also *07 Aircraft Propulsion, 28 Propellants and Fuels,* and *44 Energy Production and Conversion.*

N83-10113*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
REFURBISHMENT OF SRB ALUMINUM COMPONENTS BY WALNUT HULL BLAST REMOVAL OF PROTECTIVE COATINGS
Wendell R. Colberg, Gail H. Gordon, and Charles H. Jackson Jul. 1982 19 p refs
(NASA-TM-82499; NAS 1.15:82499) Avail: NTIS HC A02/MF A01 CSCL 21H

A test program was conducted to develop, optimize, and scale up an abrasive blasting procedure was developed for refurbishment of specific SRB components: aft skirt, forward skirt, frustrum, and painted piece parts. Test specimens utilizing 2219 T87 aluminum substrate of varying thicknesses were prepared and blasted at progressively increasing pressures with selected abrasives. Specimens were analyzed for material response. The optimum blasting parameters were determined on panel specimens and verified on a large cylindrical integrated test bed. S.L.

N83-10114# TRW Defense and Space Systems Group, Redondo Beach, Calif. Electronics and Defense Sect.
PULSED INDUCTIVE THRUSTER DEVELOPMENT (ADVANCED ELECTRIC PROPULSION TECHNOLOGY: HIGH THRUST). VOLUME 2. SUPPLEMENT Final Report, Nov. 1980 - Jun. 1982
C. L. Dailey and R. H. Lovberg Jun. 1982 16 p ref
(Contract F04611-79-C-0058; AF Proj. 5730)
(AD-A117797; AFRPL-TR-80-67-Vol-2) Avail: NTIS HC A02/MF A01 CSCL 21/3

This report describes the results of an experimental investigation of the operation and efficiency of a large impulsive plasma thruster. The thruster uses a one-meter diameter flat spiral coil through which current is pulsed from a 4000 Joule capacitor bank using a spark gap switch. The plasma is driven through inductive coupling rather than with electrodes so as to avoid erosion and energy loss mechanisms that might be undesirable for spacecraft uses. The object of this work was to verify the results of the final report, (AFRPL-TR-80-67, to which this is a supplement), and establish more data on thruster efficiency as a function of specific impulse. The original final report indicated the thruster's efficiency was 45% at 1570 sec Isp. This supplement confirms those figures and reports additional performance figure of 50% at 1590 sec Isp, 62% at 1960 Isp, and 67% at 2250 sec Isp. Author (GRA)

N83-10011# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
STATISTICAL ESTIMATION OF LIQUID PROPELLENT ROCKET ENGINE PARAMETERS
Gouwei He *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 93-100 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 8 p Original language document announced as A82-22117 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

23 CHEMISTRY AND MATERIALS (GENERAL)

Includes biochemistry and organic chemistry.

N83-10115# Canada Inst. for Scientific and Technical Information, Ottawa (Ontario).
USE OF ORGANOFLUORINE COMPOUNDS
Hiroshige Muramatsu and Shunji Nagase 1982 21 p Transl. into ENGLISH from Peterotekku (Japan), v. 3, no. 10, 1980 p 908-912
(NRC/CNR-TT-2027; ISSN-0077-5606) Avail: NTIS HC A02/MF A01

Because of their thermal and chemical stability as well as their electrical and surface active properties, fluorine organic compounds are used as refrigerants, aerosol propellants and combustion suppressors. As finishing agents they confer water and oil repellancy on natural and synthetic textiles. Fluorine organic compounds are also used as emulsifying and leveling agents; plating bath additives; lubricating oils; working fluids; and as inert liquids for testing circuits. In medical science, they are used as cancer inhibiting drugs, psychopharmocological agents, artificial bloods, and in inhalation aesthetics. Because such compounds increase the efficacy of biological activity, they are used as herbicides, insecticides, and germicides in agriculture. Harmful effects in all these applications are cited. A.R.H.

N83-10116# Oak Ridge National Lab., Tenn. Analytical Chemistry Div.
DIFFUSE RELECTANCE INFRARED FOURIER-TRANSFORM SPECTRA OF SELECTED ORGANIC COMPOUNDS
Sara H. Harmon and John E. Caton May 1982 99 p refs
(Contract W-7405-eng-26)
(DE82-015855; ORNL/TM-8321) Avail: NTIS HC A05/MF A01

Diffuse reflectance infrared spectra of a variety of different organic compounds have been determined. Profiles of the spectra along with the location and relative intensity of the principal bands have been included for each compound studied. In addition both diffuse reflectance and transmittance infrared spectra were obtained for the same samples, and the spectral results were compared. Although some minor variations are observed between a diffuse reflectance spectrum and the corresponding transmittance spectrum, the diffuse reflectance is quite useful and may be a superior technique for the study of many samples because it possesses an inherently higher signal to noise response, requires less sample preparation and allows a very wide range of samples (solids, liquids of low volatility, heat sample, or sample diluted in a reflecting medium) to be studied under very similar conditions. DOE

24 COMPOSITE MATERIALS

Includes laminates.

N83-10117* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
ION SPUTTER TEXTURED GRAPHITE Patent
James S. Sovey, Ralph Forman, Arthur N. Curren, and Edwin G. Wintucky, inventors (to NASA) Issued 15 May 1981 7 p Filed 15 May 1981 Supersedes N81-27198 (19 - 18, p 2448)
(NASA-Case-LEW-12919-1; US-Patent-4,349,424; US-Patent-Appl-SN-264378; US-Patent-Class-204-192E; US-Patent-Class-313-106; US-Patent-Class-313-107; US-Patent-Class-315-5.38) Avail: US Patent and Trademark Office CSCL 11D

A specially textured surface of pyrolytic graphite exhibits extremely low yields of secondary electrons and reduced numbers of reflected primary electrons after impingement of high energy primary electrons. An ion flux having an energy between 500 eV and 1000 eV and a current density between 1.0 mA/sq cm and 6.0 mA/sq cm produces surface roughening or texturing which is in the form of needles or spines. Such textured surfaces are especially useful as anode collector plates in high efficiency electron tube devices.
Official Gazette of the U.S. Patent and Trademark Office

N83-10118*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOWER-CURING-TEMPERATURE PMR POLYIMIDES
Peter Delvigs Oct. 1982 11 p refs Presented at the Natl. Tech. Conf. of the Soc. of Plastics Engr., Bal Harbour, Fla., 25-27 Oct. 1982
(NASA-TM-82958; E-1375; NAS 1.15:82958) Avail: NTIS HC A02/MF A01 CSCL 11G

Partial substitution of a p-aminostyrene end-cap for the monomethyl ester of 5-norbornene-2, 3-dicarboxylic acid lowered the final cure temperature of typical PMR resins from 600 F to 500 F. The weight loss characteristics of neat resins and graphite fiber composites prepared by using the mixed end-cap approach were determined at 600 F. The room temperature and short-time elevated temperature mechanical properties of the composites at 550 F and 600 F were determined. The mechanical property retention characteristics of the composites at 550 F and 600 F are discussed. Author

N83-10119*# Goodyear Aerospace Corp., Litchfield Park, Ariz.
EDGE ATTACHMENT STUDY FOR FIRE-RESISTANT CANOPIES Final Technical Report, Oct. 1978 - Sep. 1979
G. E. Wintermute Sep. 1982 158 p
(Contract NAS2-10065)
(NASA-CR-166410; NAS 1.26:166410; GERA-2424) Avail: NTIS HC A08/MF A01 CSCL 11D

Twenty-two resin systems were evaluated in laminate form for possible use as edge attachment material for fire-resistant canopies. The evaluation uncovered an unexpected development when the laminates were subjected to an intense flame: (1) the

high-heat-resistant materials could withstand the flame test quite well, but experienced rapid heat transfer through the test specimen; (2) the laminates which exhibited a low rate of heat transfer were materials which lost strength rapidly in the presence of the flame by decomposition, delamination, and blistering. Author

N83-10120*# Celanese Corp. of America, Summit, N.J.
EFFECTS OF FIBER/MATRIX INTERACTIONS ON THE PROPERTIES OF GRAPHITE/EPOXY COMPOSITES Final Report, Sep. 1980 - Dec. 1981
Paul E. McMahon and Lincoln Ying Washington NASA Sep. 1982 167 p refs
(Contract NAS1-15749)
(NASA-CR-3607; NAS 1.26:3607) Avail: NTIS HC A08/MF A01 CSCL 11D

A state-of-the-art literature review of the interactions between fibers and resin within graphite epoxy composite materials was performed. Emphasis centered on: adhesion theory; wetting characteristics of carbon fiber; load transfer mechanisms; methods to evaluate and measure interfacial bond strengths; environmental influence at the interface; and the effect of the interface/interphase on composite performance, with particular attention to impact toughness. In conjunction with the literature review, efforts were made to design experiments to study the wetting behavior of carbon fibers with various finish variants and their effect on adhesion joint strength. The properties of composites with various fiber finishes were measured and compared to the base-line properties of a control. It was shown that by tailoring the interphase properties, a 30% increase in impact toughness was achieved without loss of mechanical properties at both room and elevated temperatures. Author

N83-10121# Lockheed-California Co., Burbank.
ADVANCED RESIDUAL STRENGTH DEGRADATION RATE MODELING FOR ADVANCED COMPOSITE STRUCTURES Final Report, 1 Jul. 1979 - 29 May 1981
K. N. Lauraitis, J. T. Ryder, and D. E. Pettit Wright-Patterson AFB, Ohio AFWAL Jul. 1981 423 p refs 3 Vol.
(Contract F33615-77-C-3084; AF Proj. 2401)
(AD-A115185; LR-28360-19-Vol-3; AFWAL-TR-79-3095-Vol-3) Avail: NTIS HC A18/MF A01 CSCL 11/4

Contents: Appendixes-Quality Control Plan; Specimen Weight Measurements; Static Test Data; Damage Growth Characteristics Under Fatigue Loading; Damage Characteristics of Specimens Tested for Residual Strength; Damage Measurements of Specimens Tested for Residual Strength; Damage as Determined by Metallographic Sectioning; Comparison of Damage as Determined by Holscan Ultrasonic C-Scan and Dib Enhanced X-Ray; Damage on Individual Layers of Specimens Deplied After Fatigue Cycling; Statistical Analysis of Panel Variability; and Discussion of Weibull Function and Parameter Estimation procedures. GRA

N83-10122# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
A SHORT NOTE ON THE COMPRESSIVE BEHAVIOUR OF ARAMID FIBRE REINFORCED PLASTICS
W. H. M. vanDreumel Jan. 1982 9 p refs
(VTH-LR-341) Avail: NTIS HC A02/MF A01

Structural applications of aramid fiber composites are proposed. In spite of its low compressive strength, aramid, compared to carbon fiber, can be very attractive, especially for compression loaded structures. Young modulus of a unidirectional carbon fiber laminate as a function of the applied stress is given. The stress distribution over the thickness is depicted. Aramid fibers show an almost linear elastic stress-strain behavior over the whole range between compressive and tensile failure. The greater laminate thickness of aramid in structures with weight requirements results in better handling and impact resistance. The lower price of aramid is also an advantage. Author (ESA)

N83-10123# QED Corp., Ann Arbor, Mich.
INDUCTIVE HEATING OF SPENT GRANULAR ACTIVATED CARBON
David Mioduszewski Mar. 1982 96 p ref
(Grant NSF CEE-81-14091)
(PB82-218603; NSF/CEE-82008) Avail: NTIS HC A05/MF A01 CSCL 11B

The basic energy transfer characteristics of induction heating of activated carbon are described, and controlling process parameters are identified. Activated carbon, in its virgin state and loaded with benzene and phenol, was subjected to a range of induction heating conditions in several reactor configurations while the carbon bed temperature was monitored. The activated carbon was successfully heated to temperatures representative of thermal recognition. The influences of adsorbate type, power frequence and level, and induction coil diameter and turns on the rate of temperature rise were demonstrated. The addition of susceptor materials to the carbon bed to enhance heating was tested also, and found to have a positive effect. The energy efficiency of the carbon heating experiments was found to be favorable. Projections of energy efficiency improvements were made on the basis of an analysis of thermal energy losses in the test system. The rapid heating rate and energy efficiency of induction heating were found to complement recent trends in the state of the art of thermal regeneration of activated carbon. GRA

N83-10124# Federal Highway Administration, Washington, D.C. Paving and Structural Materials Group.
AGGREGATE MICROTEXTURE: PROFILE MEASUREMENT AND RELATED FRICTIONAL LEVELS Final Report, Jan. 1976 - Jan 1981
Stephen W. Forster Oct. 1981 40 p refs
(PB82-202565; FHWA/RD-81/107) Avail: NTIS HC A03/MF A01 CSCL 13C

Microtextural profiles of highway pavement surfaces were measured using an optical image analysis system. The profiles were characterized by three parameters: average asperity (peak) height, average asperity density (peaks per unit length of profile), average asperity shape factor (peal height to width ratio). These measurements were correlated with test results (polish values) using the British Pendulum Tester, which measures the friction of a pavement surface mainly due to microtexture. The resulting correlation coefficients indicate that the shape factor measurement correlates the best with the British Pendulum Tester. Optimal (highest corresponding Polish values) asperity shape actor values appear to be in the range of 0.16 to 0.20. Aggregate types measured included both natural and synthetic material, as well as natural aggregate treated with an impregnant. GRA

N83-10125# Virginia Highway and Transportation Research Council, Charlottesville.
INVESTIGATION OF CONCRETE MIXTURES INCORPORATING HOLLOW PLASTIC MICROSPHERES Final Report, 18 Dec. 1979 - Jul. 1981
H. Celik Ozyildirim and Michael M. Sprinkel Jul. 1981 36 p refs Sponsored by Federal Highway Administration and Virginia Dept. of Highways and Transportation
(PB82-198193; VHTRC-82-R6; FHWA/VA-82/07) Avail: NTIS HC A03/MF A01 CSCL 13C

The potential of hollow plastic microspheres (HPM) for increasing the resistance of non-air-entrained portland cement concrete to damage from cycles of freezing and thawing was investigated. A mixture with an air-entraining agent (vinsol resin) was used as the control for comparison with three experimental mixtures: one with HPM, one with super water reducers (SWR) and HPM, and one with fly asn and HPM. The HPM mixtures at dosages of 1.5% or more by weight of cement exhibited satisfactory resistance to damage from cycles of freezing and thawing. Mixtures with SWR and HPM exhibited low durability factors and failed the acceptance criterion requiring a durability factor of 60 or more. Concretes with fly ash and HPM displayed durability factors comparable to those of mixtures with the same dosages of HPM. However, the weight losses of fly ash mixtures were higher than those of comparable mixtures. To determine the cause of low durability factors in mixtures with SWR and HPM, specimens were examined using an optical microscope and scanning electron

microscope. It was found that the paste of the mixture without the SWR contained numerous well distributed HPM voids. The paste of mixtures with the SWR and the same dosage of HPM contained few HPM voids distributed throughout, but did have concentrations of HPM at the undersurface of the aggregates.
Author (GRA)

N83-10009# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
ON THE VIBRATION OF FIBER REINFORCED LAMINATED PLATES
Jidong Zhang *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 72-79 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 8 p (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

25 INORGANIC AND PHYSICAL CHEMISTRY

Includes chemical analysis, e.g., chromatography; combustion theory; electrochemistry; and photochemistry.

For related information see also *77 Thermodynamics and Statistical Physics.*

N83-10126* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
ELECTROPHORESIS DEVICE Patent
Percy H. Rhodes and Robert S. Snyder, inventors (to NASA) Issued 16 Apr. 1981 9 p Filed 16 Apr. 1981 Supersedes N81-29179 (19 - 20, p 2735)
(NASA-Case-MFS-25426-1; US-Patent-4,349,429; US-Patent-Appl-SN-254575; US-Patent-Class-204-299R) Avail: US Patent and Trademark Office CSCL 07D

A device for separating cellular particles of a sample substance into fractionated streams of different cellular species includes a casing having a distribution chamber, a separation chamber, and a collection chamber. The electrode chambers are separated from the separation chamber interior by means of passages such that flow variations and membrane variations around the slotted portion of the electrode chamber do not enduce flow perturbations into the laminar buffer curtain flowing in the separation chamber. The cellular particles of the sample are separated under the influence of the electrical field and the separation chamber into streams of different cellular species. The streams of separated cells enter a partition array in the collection chamber where they are fractionated and collected.
Official Gazette of the U.S. Patent and Trademark Office

N83-10127# British Library Lending Div., Boston Spa (England).
DONOR-ACCEPTOR COMPLEX CHROMATOGRAPHY. TETRACHLOROPHATHALIMIDOPROPYL SILICA, A NEW BONDED STATIONARY PHASE FOR SEPARATION OF COAL LIQUEFACTION PRODUCTS AND OTHER AROMATIC MIXTURES BY HPLC
W. Holstein Aug. 1981 17 p refs Transl. into ENGLISH from Chromatog. (West Germany), v. 14, no. 8, Aug. 1981 p 468-476 (BLL-BG/MRS14580/82-(9022.048); Trans-T5836) Avail: British Library Lending Div., Boston Spa, Engl.

The preparation of a tetrachlorophthalimidophase for HPLC is described. The capacity ratios of about forty aromatics and twenty nitrogen containing aromatics were determined. Most of the compounds used were alkylated. It is shown that the aromatics were eluded according to the number of rings, only slightly influenced by the substituents. A similar elution order was not observed with the heteroaromatics. The performance of the stationary phase is demonstrated, performing separations of coal liquids and other aromatic mixtures. Author

N83-10128# British Library Lending Div., Boston Spa (England).
INVESTIGATING THE POSSIBILITY OF COMBUSTION OF A MASS OF SPONGE IRON
V. N. Brinza and S. M. Krivosh 1981 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chern. Met. (USSR), v. 3, 1981 p 34-37
(M26521) Avail: British Library Lending Div., Boston Spa, Engl.

The maximum delivery of air oxygen into a bed of sponge iron brought about by thermal rarefaction falls within the temperature interval 100 C to 300 C, which is especially unfavorable for the safe storage of a metallized product, since it is precisely in this interval that the ignition temperatures of pellets reduced at 600 C to 1100 C lie. Storage of a metallized product can be made safer by making up the bed out of fractions with the greatest possible difference in geometrical dimensions, the content of the volumetric proportion of the fine fraction being held at the same time at 0.25 to 0.35. Author

N83-10129 Northwestern Univ., Evanston, Ill.
BIFURCATION AND STABILITY OF PROPAGATING OSCILLATION FLAMES Ph.D. Thesis
David Olarewaju Olagunju 1981 147 p
Avail: Univ. Microfilms Order No. DA8204949

The stability of propagating flame fronts is studied by employing a system of reaction-diffusion equations. A linear stability analysis shows that when the Lewis number, L, a physico chemical parameter exceeds some critical value L sub c > 1, a uniformly propagating adiabatic plane flame (hereafter referred to as the basic state) becomes unstable. The Lewis number is defined as the ratio of heat and mass diffusivities. In particular, when L increases past L sub c a pair of complex conjugate eigenvalue crosses the imaginary axis into the right half plane. A nonlinear analysis shows that for > L sub c solutions representing fronts whose velocities vary periodically in time bifurcate supercritically from the basic solution. The average speeds of the pulsating fronts are shown to be less than the speed of the basic state. Expressions are obtained for the amplitudes and periods of oscillations.
Dissert. Abstr.

N83-10130 California Inst. of Tech., Pasadena.
STUDIES OF CHEMICAL ADSORPTION USING LOW ENERGY ELECTRON DIFFRACTION Ph.D. Thesis
Ellen Williams 1982 197 p
Avail: Univ. Microfilms Order No. DA8203371

The nature of order in chemically adsorbed overlayers were studied using low energy diffraction (LEED). Adatom-adatom interactions were studied by measuring their most obvious manifestations; change in overlayer order during adsorption and co-adsorption, island formation, and order-disorder phenomena. The effect of the co-adsorption of hydrogen on the ordering of CO on Rh(111) were studied using LEED and thermal desorption mass spectrometry. The results indicate that the adsorption of CO proceeds via a physically adsorbed intermediate. In addition, there is a strong repulsive interaction between CO molecules and hydrogen atoms co-adsorbed on Rh(111). This interaction is apparent at distances up to 2.7 to 3.1 A indicating that it is a through metal effect. Dissert. Abstr.

N83-10131 State Univ. of New York, Buffalo.
ROLE OF TIN CATALYSTS IN THE HYDROLIQUEFACTION OF COAL Ph.D. Thesis
Meng-Chin Tsai 1981 192 p refs
Avail: Univ. Microfilms Order No. DA8204129

The role of tin catalysts was studied for the hydroliquefaction of coal in batch autoclave experiments with tetralin and tin catalysts. Two competing reactions were found to play important roles: hydrogen transfer from tetrahin to coal, and dehydrogenation/hydrogenation in the reaction Tetrahin = Naphthalene + 2H2. Experimental results indicate that (1) the addition of either SnC12 or SnS + NH4Cl strongly catalyzes the production of oil during coal hydro faction; (2) the production of tetralin and heptane soluble 'oils' depends mainly on the catalyst type; and (3) the free gas volume in the reactors at reaction conditions is an important parameter, since it influences the autogenous pressure and thus the mode of action of catalysts. Dissert. Abstr.

N83-10132 Utah Univ., Salt Lake City.
CATALYTIC HYDRODEOXYGENATION OF COAL-DERIVED LIQUIDS AND RELATED OXYGEN-CONTAINING COMPOUNDS Ph.D. Thesis
Ghulam Haider 1981 252 p
Avail: Univ. Microfilms Order No. DA8203386

Systematic catalytic hydrodeoxygenation (HDO) studies of coal derived liquids (CDL) and related model oxygen containing compounds are reported. The studies were performed in specially adapted autoclave systems, using sulfided Co-Mo/Al2O3 and Ni-W/Al2O3 as catalysts. Starting feedstocks are described. Changes in product composition as a function of experimental variables (reaction temperature, hydrogen pressure, reaction time, and catalyst type) were investigated and mechanistic aspects of the HDO reactions elucidated. HDO of the SRC-II distillate was studied as a function of reaction temperature and catalyst by means of elemental, infrared and C(3)NMR analyses of hydrotreated products. The data were used for better understanding of the complex HDO reactions involved both in primary liquefaction processes as well as in catalytic CDL upgrading by correlating the molecular level data obtained in the study of model O containing compounds with results of the investigation of the SRC II distillate. Dissert. Abstr.

N83-10133 National Physical Lab., Teddington (England). Div. of Materials Applications.
THE DEPTH DEPENDENCE OF THE DEPTH RESOLUTION IN COMPOSITION-DEPTH PROFILING WITH AUGER ELECTRON SPECTROSCOPY
M. P. Seah and C. P. Hunt Jun. 1982 22 p refs
(NPL-DMA(A)-50; ISSN-0143-7313) Copyright. Avail: Issuing Activity

Instrument and sample related depth resolution degradation in Auger spectroscopy and use of a characterized Ta205 on Ta reference material to set up instruments are considered. It is shown that for flat uniformly layered samples sputtered under ideal conditions, information depth, statistical effects and cascade mixing, electron stimulated desorption, and sample roughening limit depth resolution. Each of these can dominate at the appropriate depth for amorphous materials, but for evaporated polycrystalline metal films, the last term dominates for depths greater than 10 nm.
Author (ESA)

N83-10134*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PORE SIZE ENGINEERING APPLIED TO STARVED ELECTRO-CHEMICAL CELLS AND BATTERIES
Kathleen M. Abbey and Lawrence H. Thaller 1982 16 p refs Presented at the 17th Intersoc. Energy Conversion Eng. Conf., Los Angeles 8-13 Aug. 1982; sponsored by IEEE
(NASA-TM-82893; E-1271; NAS 1.15:82893) Avail: NTIS HC A02/MF A01 CSCL 10C

To maximize performance in starved, multiplate cells, the cell design should rely on techniques which widen the volume tolerance characteristics. These involve engineering capillary pressure differences between the components of an electrochemical cell and using these forces to promote redistribution of electrolyte to the desired optimum values. This can be implemented in practice by prescribing pore size distributions for porous back-up plates, reservoirs, and electrodes. In addition, electrolyte volume management can be controlled by incorporating different pore size distributions into the separator. In a nickel/hydrogen cell, the separator must contain pores similar in size to the small pores of both the nickel and hydrogen electrodes in order to maintain an optimum conductive path for the electrolyte. The pore size distributions of all components should overlap in such a way as to prevent drying of the separator and/or flooding of the hydrogen electrode. Author

N83-10135*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
POLYVINYL ALCOHOL MEMBRANES AS ALKALINE BATTERY SEPARATORS
Dean W. Sheibley, Olga Gonzalez-Sanabria, and Michelle Manzo 1982 23 p refs Presented at the Symp. of Membranes and Ionic and Electron. Conducting Polymers, Cleveland, 17-19 May 1982; sponsored by the Electrochemical Society
(NASA-TM-82961; E-1378; NAS 1.15:82961) Avail: NTIS HC A02/MF A01 CSCL 10C

Polyvinly alcohol (PVA) cross-linked with aldehyde reagents yields membranes that demonstrate properties that make them suitable for use as alkaline battery separators. Film properties can be controlled by the choice of cross-linker, cross-link density and the method of cross-linking. Three methods of cross-linking and their effects on film properties are discussed. Film properties can also be modified by using a copolymer of vinyl alcohol and acrylic acid as the base for the separator and cross-linking it similarly to the PVA. Fillers can be incorporated into the films to further modify film properties. Results of separator screening tests and cell tests for several variations of PBA films are discussed.
Author

N83-10136 Illinois Univ., Urbana-Champaign.
FLAMES IN STRAINING FLOWS Ph.D. Thesis
David Walter Mikolaitis 1981 111 p
Avail: Univ. Microfilms Order No. DA8203534

A model is proposed for flammability limits based on flame stretch that is applicable to upward propagation through lean methane/air mixtures in round tube. Predictions of the model are in good agreement with experiment. Premixed flames in a rear stagnation point flow are studied using activation energy asymptotics. Multiple steady states the response that are physically attainable. Variations of the flow-rate at blow-off with equivalence ratio are predicted and compared with experimental data.
Dissert. Abstr.

N83-10137# Crystacomm, Inc., Mountain View, Calif.
INVESTIGATION OF LARGE DIAMETER POLYCRYSTALLINE CRUCIBLE SHAPED InP Final Status Report, 1 May 1981 - 30 Apr. 1982
George A. Antypas Jul. 1982 17 p refs
(Contract N00014-81-C-2231)
(AD-A117739; FSR-4) Avail: NTIS HC A02/MF A01 CSCL 07/3

Two processes are described for the synthesis of polycrystalline crucible shaped InP, vertical Bridgman and Phosphorus injection to boric oxide encapsulated Indium. While both processes appear attractive the latter is more promising since it could potentially result in situ growth of InP. Author (GRA)

N83-10138# Pratt and Whitney Aircraft Group, West Palm Beach, Fla. Government Products Div.
AUGMENTOR STABILITY MANAGEMENT PROGRAM USER'S MANUAL Final Report, 1 Sep. 1979 - 1 Sep. 1981
R. C. Ernst Wright-Patterson AFB, Ohio AFWAL Nov. 1981 114 p
(Contract F33615-79-C-2059; AF Proj. 3066)
(AD-A117749; AFWAL-TR-81-2113; PWA-FR-15323) Avail: NTIS HC A06/MF A01 CSCL 21/2

This report describes the computer code and the models developed to form the computer code used to analyze low frequency augmentor instability (rumble). Rumble occurs mainly at high fuel-air ratios and at flight Mach numbers and altitudes were low duct inlet air temperatures and pressures exist. Complete description of the models and the program responsible for their development is contained in AFWAL-TR-81-2113. Author (GRA)

N83-10139# Texas Univ., Austin. Dept. of Chemistry.
PROPERTIES OF Pt SUPPORTED ON OXIDES OF TITANIUM Technical Progress Report, 1 Jan. - 31 Dec. 1981
Bor-Her Chen and J. M. White 9 Jun. 1982 20 p refs Submitted for publication
(Contract N00014-75-C-0922; NR Proj. 056-578)
(AD-A117892; TR-23) Avail: NTIS HC A02/MF A01 CSCL 07/4

Platinum, suppported on TiO2, TiO and Ti2O3 in various forms,

has been investigated using a variety of physical and chemical techniques. On H2 pretreated TiO2, on TiO and on Ti2O3 samples (all platinized), SMSI behavior, i.e. limited H2 uptake, was noted. Very fast H-for-D exchange rates were observed for H2D2 mixtures on all these materials indicating that dissociative adsorption still occurs readily. Using XPS, SAES, TEM and STEM data we conclude that surface contamination, diffusion of Pt into the bulk oxide, Formation of surface mixed metal oxides and metal agglomeration are not significant contributors to the observed loss of H2 uptake capacity. On the basis of qualitative bulk electrical conductivity data and XPS data, we suggest that the SMSI effect is best understood in terms of a bulk oxide reduction model. In this model, bulk conduction band electrons tunnel readily through a thin TiO2 layer at the surface to reach Pt particles where they are trapped and furnish a negatively charged Pt particle with good capacity for dissociating H2 but weak binding of atoms. Author (GRA)

N83-10140# Yale Univ., New Haven, Conn. School of Medicine.

DEVELOPMENT OF NEWER METHODS FOR THE ISOLATION AND IDENTIFICATION OF CERTAIN COMPONENTS FOUND IN COMPLEX MIXTURES DERIVED FROM ENERGY SOURCES AND THE DETERMINATION OF THEIR TOXICITY VIA BIOASSAY SYSTEMS

S. R. Lipsky 22 Jun. 1982 63 p refs
(Contract DE-AC02-76EV-02958)
(DE82-019043; DOE/EV-02958/6) Avail: NTIS HC A04/MF A01

By utilizing a multidimensional gas chromatographic-mass spectrometer system, individual chemical components from complex mixtures of organic compounds derived from certain energy sources were isolated and trapped out into segments of blank fused silica glass capillary tubing. These substances were then introduced into a very sensitive bioassay flow system. Here, the toxicity of these materials present in the 1 to 50 nanogram range was assessed. Thus far, from the analysis of over 70 different chemicals determined in this manner and compared with the results obtained with the conventional assay system, an excellent correlation was noted. DOE

N83-10141# Rockwell International Corp., Golden, Colo. Energy Systems Group.

PHOTOCHEMICAL REACTIONS IN PLUTONIUM-NITRIC ACID SOLUTIONS

Armen R. Kazanjian 9 Dec. 1981 8 p refs
(Contract DE-AC04-76DP-03533)
(DE82-005852; RFP-3113) Avail: NTIS HC A02/MF A01

Plutonium in its various valence states in HNO3 solutions was irradiated with ultraviolet visible light and visible light. Oxidation was the only reaction; plutonium (III) was oxidized to plutonium (IV) and plutonium (IV) was oxidized to plutonium (VI). The oxidation of plutonium (IV) was dependent on the acid concentration and the spectral portion of the light source used. There was no reduction of plutonium (VI) in solutions with HNO3 concentrations ranging from 0.5 to 7N. Plutonium polymer solutions also were irradiated with ultraviolet visible light, which greatly accelerated the decomposition of both freshly formed and aged polymers. DOE

N83-10142# Technische Univ., Berlin (West Germany).

INVESTIGATION OF EXTRACTS BY FLUIDIZED BED EXTRACTION Final Report, Aug. 1981

Heinz MeierzuKoecker and Udo Hellwig Bonn Bundesministerium fuer Forschung und Technologie May 1982 83 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-068; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17,50

The indirect hydrogenation of coal extracts process in which in a first step the coal is mixed with a hydrogenating solvent and where in a second step after separation of ashes and coal residues the extract is hydrogenated, was studied. Main drawbacks are the extraction process, the separation between extracts and residues, and the instability of the extracts, leading to a rapid deterioration of the ability to be hydrogenated. The hydrogenation ability of extracts obtained by a fluidized bed process, the use of a cheap solvent derivated if possible from the hydrogenating process itself, the adaptability of the process to the use of low grade coal with, for instance, high ash content or of brown coal, and the possibility to transpose the technique from the discontinuous working laboratory installation to a semi-continuous pilot plant were investigated. Author (ESA)

N83-10143# Bergbau-Forschung G.m.b.H., Essen (West Germany). Abt. Physikalische Chemie.

COAL GASIFICATION OF STEAM-SOLUTED CATALYST Final Report, Dec. 1980

Alfred Sulimma and Karl Heinrich vanHeek Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 50 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-073; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

It was proven that alkaline catalysts such as K2C03 and KOH, were the most effective catalysts in the gasification process of coal. The way of introducing the catalyst, e.g., by dry mixing with the coal, by impregnating coal with water solutions of the catalyst, or by bounding the catalyst chemically to the coal, were proven to be of prime importance. A method of charging the catalyst under the form of high pressure steam solutions in a fluidized bed processor was investigated. It is shown that this method is efficient, that the acceleration of the gasification process is dependent on the amount of catalyst present in the reactor, as far as the concentration of catalyst exceeds a lower level due to reactions between the catalyst and the coal minerals, and that the catalyst stays in the fluidized bed up to a high degree of gasification. This finding has significance for the allothermic steam gasification of the PNP project where the coal loaded with catalyst migrates through the horizontal reactor. The reaction rates are increased by a factor of 10 or more even at low initial catalyst concentrations. Author (ESA)

N83-10144# Amberger Kaolinwerke G.m.b.H., Hirschau (West Germany). Forschungslabor.

SEPARATION OF A FELDSPAR/QUARTZ SUSPENSION IN THE PARTICLE RANGE FROM 0.1 TO 1.5/2.0 MM INTO FELDSPAR AND QUARTZ BY FLOTATION Final Report, Jun. 1980

Waldemar Cebula and Johann Drexler Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 21 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-096; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,50

The obtention of fledspar, containing at least 90 % feldspar, and of quartz sand, containing less than 5 % feldspar, with a maximum particle size of 1.5 or even better 2 mm was investigated. In a pilot plant it was possible to separate the heavy minerals through oxide flotation and achieve a heavy material content from 0.2 % by using a Denver mixer, and from 0.006 % by using a Wemco mixer. The desired feldspar/quartz quality could not be reached with the primary product used. An industrial realization of this project is therefore not possible. Author (ESA)

N83-10145# Technische Hochschule, Aachen (West Germany). Inst. fuer Aufbereitung.

DESULFURIZATION OF COAL BY MEANS OF THE BATAC-JIG Final Report, Mar. 1981

Willi Schollmeier and Carl Walenzik Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 164 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-100; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,50

The different separation possibilities were studied and it was

shown that the jig process is very favorable. Tests with coal in the grain size range from ten to zero mm which permitted to find the best adjustment of the Batac-jig are described. Further investigations on coal in the grain size from two to zero mm were also carried out. The investigation shows that the Batac-jig is suitable for de-ash and desulfurizing of the examined type of coal containing 50 % by weight of finest grains, with a good sharpness of separation. Author (ESA)

N83-10146# Kraftwerk Union A.G. Reaktortechnik, Erlangen (West Germany). Hauptbereich Vertrieb und Kraftwerkstechnik.
HARD COAL GASIFICATION USING CATALYSTS DISSOLVED IN STEAM Final Report, Jan. 1981
Dieter Reinhardt Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 181 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-107; ISSN-0340-7608) Avail: NTIS HC A09/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 34,50

Process energy, resulting from a high temperature reactor, is considered. Use of nuclear energy for gasification of hard coal is not economical. A method to overcome this difficulty, is to increase gasification rate by adding a catalyst. The catalyst is introduced by dissolving it in the gasifying medium. Poor solubility of the catalytically active salts in steam at pressures below 100 bars, is overcome by a supersaturating technique. For very diluted catalyst concentrations, this process appears to be superior compared to concurrent methods of catalyst addition. Moreover, catalyst feed during the course of the reaction might be an advantage of the process. Author (ESA)

N83-10147# National Bureau of Standards, Washington, D.C.
STANDARD REFERENCE MATERIALS: A STANDARD REFERENCE MATERIAL CONTAINING NOMINALLY FIFTEEN PERCENT AUSTENITE (SRM 486) Final Report
C. G. Interrante and G. E. Hicho Jan. 1982 38 p refs
(PB82-215559; NBS-SP-260-73; LC-81-600173) Avail: NTIS HC A03/MF A01 CSCL 07D

This Standard Reference Material, SRM-486, intended for the calibration of X-ray diffraction equipment used in determining the amount of retained austenite in ferrous materials is described. It was produced using powder metallurgical techniques and known amounts of type 310 stainless steel powder (austenitic) and type 430 stainless steel powder (ferritic) to make a blend of 15 percent by weight (14.7 percent by volume) austenite in ferrite. From a larger blend of these powders, powder for 174 compacts was taken. Using 12 of these compacts, a calibration curve was established for the certification of the remaining compacts. The curve relates the nickel X-ray count rate of X-ray fluorescence measurements to the volume percentage of austenite as determined by quantitative microscopy measurements of area percentage. The mean percentage austenite for 162 certified standards is 14.7 volume percent; this value exactly equals the volume percentage of austenite powder in the original blend. X-ray diffraction determinations of the austenite content are in good agreement with the certified content of austenite. The SRM may be used as an X-ray diffraction standard for austenite or, in special cases, as in X-ray fluorescence standard for nickel content. GRA

N83-10148# New Mexico Univ., Albuquerque. Dept. of Chemical and Nuclear Engineering.
A STUDY OF THE IN-SITU INDIRECT FREEZING PROCESS, VOLUME 2 Final Report
C. Y. Cheng Jan. 1981 77 p refs
(Contract DI-14-34-0001-8528)
(PB82-200742; NE-87(81)OWRT-476-2-Vol-2) Avail: NTIS HC A05/MF A01 CSCL 07D

High degree separations of aqueous and organic mixtures were accomplished and an energy saving realized by the in situ indirect freezing process conducted in a small conduit freezer melter. The process has two versions: the first version, denoted as the dendritic deposit approach, is useful in accomplishing a high degree separation of a concentrated solution and the second version, denoted as the smooth deposit approach, is useful in a high degree purification of a dilute solution. A pressure induced nucleation approach and a seeded feed approach with ultrasonic nucleation have been introduced to initiate a freezing step uniformly; a pressure programmed supersaturation approach has been introduced to obtain a close control for heat transfer and a close control of the morphology of the deposited solid phase. Products containing less than 350 ppm NaCl were obtained from feeds containing 40,000 ppm and 5000 ppm respectively by the two approaches. GRA

N83-10149# New Mexico Univ., Albuquerque. Dept. of Chemical and Nuclear Engineering.
A STUDY OF THE VACUUM FREEZING HIGH PRESSURE ICE-MELTING PROCESS, VOLUME 1 Final Report
C. Y. Cheng Jan. 1981 85 p refs
(Contract DI-14-34-0001-8528)
(PB82-200734; NE-87(81)OWRT-476-2-Vol-1) Avail: NTIS HC A05/MF A01 CSCL 07D

An aqueous solution was flash vaporized under a reduced pressure to simultaneously form a low pressure water vapor and ice crystals. The ice formed was first purified in a counter-washer and then melted inside of heat conductive conduits under a high pressure (e.g., 500 atm.) and the low pressure water vapor was desublimed to form desublimate (ice) on the outside of the conduits. The latent heat of desublimation released was utilized in supplying the heat needed in the ice-melting operation. The desublimate was removed intermittently by an in-situ dissolution operation utilizing the feed solution and an equivalent amount of ice was formed inside of the conduits. The process, which uses components that are available commercially and can be reliably operated, is highly energy efficient and cost competitive with other desalination processes and conventional evaporation processes. The process is useful in desalination of brackish water and sea water and in concentrating industrial aqueous solutions. Author

N83-10150# Yale Univ., New Haven, Conn. Section of Applied Physics.
IN SITU MONITORING OF ELECTROCHEMICAL REACTIONS BY SURFACE ENHANCED RAMAN SCATTERING Annual Report, 1 Jul. 1980 - 30 Jun. 1981
Richard K. Chang Aug. 1981 19 p
(PB82-216128; GRI-80/0106) Avail: NTIS HC A02/MF A01 CSCL 07D

Several aspects of the recently discovered surface enhanced Raman scattering (SERS) from molecules adsorbed on a metal liquid or metal gas interface were investigated. Since the physical origins of such a large enhancement factor are not yet fully understood, we pursued the topic of SERS from the basic science aspect, concentrating mainly on the electromagnetic antenna enhancement effect associated with noble metal spheres suspended in water (Au and Ag colloids). We also pursued the topic of SERS from the applications aspect, concentrating mainly on the correlation between the SERS spectra of adsorbed molecular species and the electrochemical cyclic voltammograms. This ability to provide molecular specific information on ions and molecules adsorbed on noble metal (Ag, Au, and Cu) electrodes, immersed in various electrolytes and controlled by a potentiostat, has eventual relevance to the H2/O2 Pt-acid fuel cell system. In addition, we applied SERS to the monitoring of adsorbed molecules catalytically formed on Ag powder which had been briefly exposed to SO2 or NO2 gas introduced into a purging stream (He gas). Author

N83-10151# McNeese State Univ., Lake Charles, La.
STANDARDIZATION OF SAMPLING AND ANALYSIS OF GEOPRESSURED FLUIDS. PART 2: MONITORING OF GEOPRESSURED WELLS Final Report, 1 May 1980 - 31 Jul. 1981
B. E. Hankins and O. C. Karkalits Aug. 1981 91 p refs
(GRI-5080-321-0301)
Avail: NTIS HC A05/MF A01 CSCL 07D

Chemical analyses of geopressured fluids (brine and gas)

obtained from seven walls are reported. The analyses were made by the on site chemical subcontractor and collaborating research laboratories. McNeese State University served as quality control contractor for GRI. McNeese sent aliquots of the samples (referred to as round robin samples) to the collaborators for quality control check analyses. The data have been collated and subjected to a statistical study. Based on these data, recommendations have been made regarding future quality control measures and possible revisions of the Standard Procedures Manual. GRA

N83-10152# Technical Research Centre of Finland, Espoo. Chemical Lab.

A THERMAL DESORPTION COLD-TRAP UNIT FOR GAS-CHROMATOGRAPHIC ANALYSIS OF GASEOUS ORGANIC POLLUTANTS

Vuokko Karlsson and Frans Schulting (Research Inst. for Environmental Hygiene, Delft, Netherlands) 1981 31 p refs

(PB82-206368; VTT-15/1981; ISBN-951-38-1284-7; ISSN-0358-5085) Copyright. Avail: NTIS HC A03/MF A01 CSCL 07D

In atmospheric sampling, a preconcentration step is often necessary to raise the concentration of the pollutants above the sensitivity level of the detecting apparatus. During the work period at ING-TNO, a thermal desorption cold trap (TCT) unit was fitted up. The TCT unit was built for preparation of on solid sorbent material concentrated samples for further analysis. The optimum settings for efficient desorption as well as for cooling and heating of the cold trap were tested. The desorption efficiency of the instrument was at least 95%. No cold spots or dead points were observed where the sample compounds could condensate and remain. The TCT unit did neither cause any peak broadening or separation problems. The developed technique was applied to ambient air and automobile exhaust analysis. Author

N83-10153# National Bureau of Standards, Washington, D.C. Polymer Science and Standards Div.

MIGRATION OF LOW MOLECULAR WEIGHT ADDITIVES IN POLYOLEFINS AND COPOLYMERS Final Report

S. S. Chang, G. A. Senich, and L. E. Smith Mar. 1982 148 p refs Prepared for Food and Drug Administration, Washington, D.C.

(PB82-196403; NBSIR-82-2472) Avail: NTIS HC A07/MF A01 CSCL 07D

Food packaging is an inseparable part of modern life. Any substance that migrates from the packaging material into foods is viewed as indirect food additives. In connection with toxicological knowledge, it is important to know the amount of such indirect food additives expected to be present in the food during storage and processing. This program, sponsored by the Bureau of Foods of the Food and Drug Administration is to provide theoretical models, reliable data base, methodology to study the migration phenomena and to provide reasonable worst case estimates for the concentrations of the indirect additives in food. The results of approximately 250 completed migration experiments based on radiotracer techniques are presented on the migration of low molecular weight hydrocarbons and antioxidants from polyethylene, polypropylene and ethylene vinyl acetate copolymers. Results of a study for the determination of relative diffusion coefficients of several probe molecules in the polyethylene melt by inverse gas chromatography are also presented. Based on these studies, ethanol appears to be a far more reasonable food oil stimulating solvent than n-heptane. Other pure or mixed triglycerides may also be considered as food oil simulating solvents, however they may pose the same analytical difficulties as that of the food oil itself. Author

N83-10154# Department of Agriculture, Washington, D.C. Economic Research Service.

ESTIMATED CAPACITY OF US ETHANOL PLANTS

Mohinder Gill and Annette D. Dargan Feb. 1982 38 p refs

(PB82-203647; AGESS-820210) Avail: NTIS HC A03/MF A01 CSCL 07A

Data on U.S. alcohol fuel production capacity for 1980 to 83 is given. The major feedstock used is corn because of its availability and the technical ease of conversion to alcohol by means of the well-known fermentation process. The Corn Belt is currently the leading alcohol fuel production region. The estimates of likely, optimistic, and highly optimistic capacity by the end of 1983 are 1.5, 1.7, and 2 billion gallons, respectively. These estimates indicate that the national alcohol fuel production goal of 60,000 barrels per day (920 million gallons per year) by the end of 1982 will not be achieved. Author (GRA)

N83-10155# Bureau of Mines, Salt Lake City, Utah.

ORIFICE PLATE DESIGN STUDIES FOR A MULTIPLE-COMPARTMENT, ION-EXCHANGE COLUMN

G. R. Palmer, I. L. Nichols, R. G. Smith, and D. C. Seidel Mar. 1982 23 p refs

(PB82-201310; BM-RI-8616) Avail: NTIS HC A02/MF A01 CSCL 07A

Preliminary studies by the Bureau of Mines were conducted to determine the feasibility of a multiple-compartment, ion-exchange (MCIX) column simulator for examining the effect of multiple-orifice plates in the column. A rectangular, five-orifice, three-compartment, MCIX simulator with a cross-sectional plate was used for the investigation. Orifices with open areas of 1, 3, and 5 percent were used with various operating conditions. The study was separated into three separate sections: (1) solution flow effect, (2) fluidized effect, and (3) resin transfer effect. The solution flow and fluidization studies showed that for solution flow rates of about 3 gallons per minute per square foot, a 1-percent open area plate functioned best, while at solution flow rates of 9 and 15 gallons per minute per square foot, the best open areas were 3 and 5 percent, respectively. Author (GRA)

N83-10156# Battelle Pacific Northwest Labs., Richland, Wash.

KINETICS AND CATALYSIS OF PRODUCING SYNTHETIC GASES FROM BIOMASS Annual Report, 7 Dec. 1980 - 6 Dec. 1981

L. J. Sealock, Jr., D. C. Elliott, R. T. Hallen, R. D. Barrows, and S. L. Weber Dec. 1981 175 p refs

(Contract GRI-5014-361-0242)

(PB82-214347; GRI-80/0116) Avail: NTIS HC A08/MF A01 CSCL 07D

The kinetics, reaction sequences and pathways involved in pyrolysis and catalytic steam gasification of wood and wood components are investigated. A one liter stirred autoclave was used to study gasification in a low temperature regime (100 C to 450 C). The autoclave was successfully modified to allow remote sampling of the liquid and gaseous phases present in the reaction environment. A two inch diameter batch reactor is being used to study gasification at higher tempatures (550 C to 850 C). Kinetic studies of the gasification reactions relative to cellulose, holocellulose, lignin, and Douglas air gasification were completed. Reaction rate constant and activation energies were determined for catalyzed and uncatalyzed cases. The formation of specific compounds during gasification in the presence and absence of catalysts was investigated in both reactor systems. Results of the low and high temperature experiments demonstrated dramatic differences in the kinetics and gas composition as a function of the various catalyst cases and components tested. GRA

N83-10157# Oklahoma Univ., Norman. School of Chemical Engineering and Materials Science.

EQUATION OF STATE STUDY FOR POLAR FLUIDS Annual Report, Nov. 1980 - Nov. 1981

Nov. 1981 105 p

(Contract GRI-5080-363-0376)

(PB82-214388) Avail: NTIS HC A06/MF A01 CSCL 07D

Based on perturbation theory, the use of an isotropic reference system was studied with the conclusion that the reference system used in the perturbation theory for polar fluids has to take steric effects into account. The recently developed hard convex body (HCB) equation of state, was augmented with the addition of an attractive part which was taken from the second virial coefficient. The resultant augmented HCB equation of state can accurately

predict liquid and vapor phase thermodynamic properties for nonpolar hydrocarbons. The roles of repulsive and attractive intermolecular forces in the equation of state was investigated employing results from computer simulation and statistical mechanics. GRA

N83-10158# Geological Survey, Denver, Colo. Water Resources Div.
RECONNAISSANCE SAMPLINGS AND CHARACTERIZATION OF AQUATIC HUMIC SUBSTANCES AT THE YUMA DESALTING TEST FACILITY, ARIZONA Final Report
R. L. Malcolm, R. L. Wershaw, E. M. Thurman, G. R. Aiken, D. J. Pinckney, and J. Kaakinen Dec. 1981 88 p refs Sponsored by the Bureau of Reclamation
(PB82-177965; USGS/WRI-81-42) Avail: NTIS HC A05/MF A01 CSCL 07D

Smectite clay minerals were found to be the principal component on the surface of the cellulose-acetate, reverse-osmosis membranes at the Yuma Desalting Test Facility. These clay minerals were not present in the pumped ground water, but were blown into the conveyance canal from adjacent soils. Humic substances from the water and suspended sediments were associated with the clay films on the membrane, but no definitive conclusions concerning their role in fouling were reached. Microbial fouling is believed to be only a minor aspect of membrane fouling. Chemical and physical changes in humic substances were extensively studied at four points in the water treatment process. Humic substances accounted for the largest component (over 25 percent) of organic constituents. Humic substances in the canal source water were similar to other aquatic humic substances present in natural waters. During the treatment process, these substances were brominated and decolorized. The effect of these halogenated humic substances on membrane fouling is unclear, but their presence in the reverse-osmosis product water and reverse-osmosis reject brine along with volatile trihalomethanes has led to environmental concerns. Author (GRA)

N83-10159# Bureau of Mines, Albany, Oreg.
ELECTROCHEMICAL DETERMINATION OF GIBBS ENERGIES OF FORMATION OF COBALT AND NICKEL SULFIDES
Seth C. Schaefer Jan. 1982 25 p refs
(PB82-177304; BM-RI-8588) Avail: NTIS HC A02/MF A01 CSCL 07D

The standard Gibbs energies of cobalt sulfide and nickel sulfide were determined with high temperature galvanic cells using stabilized zirconia as the electrolyte. GRA

N83-10160# Colorado School of Mines, Golden.
LIQUID-VAPOR EQUILIBRIUM FOR TERNARY NATURAL GAS SYSTEM Annual Report, Oct. 1980 - Oct. 1981
A. J. Kidnay and E. D. Sloan Sep. 1981 61 p refs
(Contract GRI-5014-363-0198; Grant NSF ENG-79-04440)
(PB82-227679; GRI-82/0008) Avail: NTIS HC A04/MF A01 CSCL 07D

Vapor liquid equilibrium (VLE) data were measured for the nitrogen + carbon dioxide binary system at 220 and 240 K and for the methane + carbon dioxide system at 219.26, 240 and 270 K. Ternary VLE measurements were made for the system N + CH4 + CO2 at 220 K and 6.080, 9.119 and 12.159 MPa, 233.15 K at 8.106 MPa, and 240 K at 7.093, 9.119 and 12. 159 MPa. The multifluid reference corresponding states method proposed by Teja and Rice was applied to VLE calculations and the results of this method for the binary and ternary systems were compared with the results of the Lee-Kesler corresponding states correlation and the Peng-Robinson equation of state. The multifluid and Lee-Kesler methods give comparable results for the constituent binaries of the N2 + CH4 + CO2 system. However, the multifluid model predictions for the ternary system were superior to the predictions of the Lee-Kesler method. The Peng-Robinson equation of state was found to be better than both corresponding states methods for both binary and ternary system VLE predictions. None of the methods produced good representation near the critical points of the binary and ternary systems. Author

N83-10161# Institute of Gas Technology, Chicago, Ill. Photochemistry Dept.
SOLAR-ASSISTED HYDROGEN GENERATION BY PHOTOELECTROCATALYSIS Annual Report, Mar. 1980 - Feb. 1981
Peter G. Ang, Paul F. Richardson, Phek Hwee Yen, Anthony J. Tiller, Anthony A. Rossignuolo, and Anthony F. Sammells Mar. 1982 63 p refs
(Contract GRI-5014-361-0262)
(PB82-227612; GRI-80/0113) Avail: NTIS HC A04/MF A01 CSCL 07D

Improved photoanodes were developed by surface modification of oxide semiconductor electrodes. Semiconductors evaluated were iron oxide, strontium titanate, and titanium dioxide. Application of selected O2 evolution catalysts onto the surface of the semiconductors resulted in electrodes with larger photocurrents. The increase varied with the operating potential of the electrode. This enhancement was found to depend on the technique used to deposit the catalyst onto the surface. Polycrystalline iron oxide photoanodes, prepared by heating high purity iron foil in a natural gas/air flame showed improved photocurrents after small amounts of platinum were sputtered onto its surface. Large photocurrents were also obtained after electrodeposition of rhodium onto iron oxide electrodes. Single crystal strontium titanate photoanodes demonstrated enhanced photocurrents after being dipped in a chloroplatinic acid or iridium chloride solution. Titanium dioxide electrodes, formed by oxidation of high purity titanium foil in a natural gas/air flame, exhibited increased photocurrents after platinum was sputtered onto the surface. Increases in photocurrents and cathodic dark currents were also achieved with titanium dioxide upon electrodeposition of ruthenium from RuO4 solution. GRA

26 METALLIC MATERIALS

Includes physical, chemical, and mechanical properties of metals, e.g., corrosion; and metallurgy.

N83-10162 British Library Lending Div., Boston Spa (England).
DEVELOPMENT AND APPLICATION OF AUSTENITIC CAST IRON CONTAINING SPHERICAL GRAPHITE FOR THE MECHANICAL STRUCTURE OF A FUSION REACTOR
Kurz Feuring May 1982 27 p Transl. into ENGLISH from Giesserei (West Germany), v. 67, no. 25, 8 Dec. 1981 p 799-805
(BLL-CTO-2075-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

The suitability of GGG-NiMn 13 7 austenitic cast iron for large heavy castings having special quality requirements was established on the basis of comprehensive research and development. The favorable combination of good static and dynamic strength, the low degree of hardness and good casting properties also make this high quality material of interest for other applications. S.L.

N83-10163# British Library Lending Div., Boston Spa (England).
THE NUCLEATION AND FORMING OF NON-METALLIC INCLUSIONS IN THE CRYSTALLIZATION OF AN INGOT
V. T. Borisov, V. A. Petrovskii, and R. E. Volkov 1981 8 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chern. Met. (USSR), v. 3, 1981 p 1-4
(BLL-M26518) Avail: British Library Lending Div., Boston Spa, Engl.

A Monte Carlo model was used and criteria were established to show the limit of applicability of the macroscopic theory of nucleation of nonmetallic inclusions in the liquid phase. A study of the kinetics of growth of the nucleus shows that a high proportion of the growth period is spent in initial growth when the properties of the nucleus are still not macroscopic, so that the nucleation theory of Povolotskii and Roshchin is incorrect in assuming macroscopic properties for nuclei of any size. A modified theory is developed, and it is shown to be possible to predict the amount and composition of inclusions of different types, formed during crystallization of an ingot. An illustrative example is given for the steel ShKh15. A.R.H.

N83-10164# British Library Lending Div., Boston Spa (England).
THE REMOVAL OF NON-METALLIC INCLUSIONS FROM STEEL
Yu. I. Utochkin and V. A. Grigoryan 1981 7 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved., Chern. Met. (USSR), v. 3, 1981 p 4-6
(BLL-M26519) Avail: British Library Lending Div., Boston Spa, Engl.

Heterogeneous nucleation plays a predominant role in real (industrial) conditions. For rapid and sufficiently complete removal of deoxidation products from the melt, coarse inclusions must be formed with low FeO and MnO contents. The process is facilitated by combined deoxidation and slag treatment in the ladle (or in the ingot mould). S.L.

N83-10165# British Library Lending Div., Boston Spa (England).
AN INVESTIGATION ON A MODEL OF THE SLAG-METAL TRANSITION ZONE
E. K. Shevtsov and G. M. Glinkov 1982 5 p refs Transl. into ENGLISH from Izv. Vyssh. Ucheb. Zaved. Chernaya Metall. (USSR), no. 3, 1981 p 54-56
(BLL-M26523) Avail: British Library Lending Div., Boston Spa, Engl.

The transition zone was examined in a water model using kerosene or transformer oil to simulate the slag. Conversion of the model results to full scale conditions was effected by the use of Froude, Weber and Reynolds criteria. The magnitude of the reaction surface was estimated from the slag-metal interface, the thickness of the transition layer and the diameter of the slag and metal droplets. Thus, the part played by the transition zone in the oxidation of impurities was estimated. The formation of the zone from the energy released from bubbles is discussed and confirmed by experiment using acetic acid crystals in an aqueous solution of soda. Bursting bubbles increase the transition zone but also contaminate the steel with non-metallic inclusions. It is, therefore, essential that the refining period be carried out as rapidly as possible so that, at the end of the period, the rate of carbon oxidation attained will ensure a minimum of transition zone and of inclusions. Author

N83-10166 Illinois Univ., Urbana-Champaign.
THE EFFECT OF PHASE TRANSFORMATION ON THE FATIGUE CRACK GROWTH RATE OF AUSTENTIC STAINLESS STEELS TESTED IN ARGON AND HYDROGEN ATMOSPHERES Ph.D. Thesis
Gary Benjamin August Schuster 1981 190 p
Avail: Univ. Microfilms Order No. DA8203582

A comparative study of the fatigue crack growth rate (FCGR) of two austenitic stainless steels, AISI 301 and AISI 302 shows that the relatively unstable AISI 301 stainless steel has a FCGR approximately 50 percent lower than AISI 302 stainless steel when tested in argon or air at a low mean stress, less than 66 MPa. At higher mean stresses the FCGR's are equal. The plastic zone sizes of AISI 301 specimens are generally smaller than for AISI 302. The cause for the lower FCGR observed in the AISI 301 seems to be the residual compressive stresses that develop around the crack tip as a result of the martensite formation. Testing in hydrogen caused the FCGR of both steels to greatly increase with the AISI 301 being affected to a much larger extent. Glancing incidence electron diffraction showed that the fatigue crack preferentially followed the alpha' when tested in hydrogen. This indicates that the alpha' is being embrittled and is thereby causing the observed increase in FCGR. Dissert. Abstr.

N83-10167 Illinois Univ., Urbana-Champaign.
CRYSTAL GROWTH, PHASE TRANSFORMATIONS AND ELECTRICAL PROPERTIES OF METASTABLE GALLIUM ANTIMONIDE GERMANIUM ALLOYS Ph.D. Thesis
Kenneth Charles Caiden 1981 105 p refs
Avail: Univ. Microfilms Order No. DA8203414

Single crystal metastable (GaSb)(1-x)Ge(x) alloys were grown on GaAs substrates with compositions across the GaSb-Ge pseudobinary phase diagram. The alloys transformed to the equilibrium state through a continuous series of metastable states at a rate limited by diffusion. Ion bombardment during growth had a strong influence on the transformation rate kinetics; however, no preferential sputtering occurred during the sputter growth of as-deposited single phase alloys. The measured enthalpies of transformation from the crystalline metastable to the equilibrium state agreed with enthalpies predicted using the regular solution model. The measured carrier concentrations and mobilities were consistent with the materials being disordered. Dissert. Abstr.

N83-10168 Northwestern Univ., Evanston, Ill.
HIGH TEMPERATURE GRAIN BOUNDARY CAVITATION IN OXIDE DISPERSED COPPER Ph.D. Thesis
Rong-Tsang Chen 1981 146 p refs
Avail: Univ. Microfilms Order No. DA820486

A study of cavity formation on grain boundary second phase particles was made in two internally oxidized copper alloys (CuSiO2 and Cu-TiO2). TEM observation of two stage shadowed replicas was employed to resolve the small grain boundary cavities in carefully electropolished samples which had been subjected to creep or fatigue at high temperatures. Cavities were found to nucleate at the intersection between grain boundaries and particles. TEM examination revealed that cavity nucleation is continuous throughout the tests, whether creep or fatigue. The extend of cavitation was determined as a function of microstructural parameters and testing variables. In the case of fatigue, the cavitation level was found to increase with the number of testing cycles. In creep tests, the cavitation level was found to increase with the creep time. Higher particle/matrix interfacial energy and room temperature prestraining were found to promote cavity formation. Cu-SiO2 bicrystal samples were prepared for creep testing. Cavities were found to nucleate on the tension side of the grain boundary particles. Dissert. Abstr.

N83-10169 National Physical Lab., Teddington (England). Div. of Information Technology and Computing.
THEORETICAL MODELLING OF THE ELECTROCHEMISTRY IN A CORROSION FATIGUE CRACK. NUMERICAL SOLUTION OF TIME-DEPENDENT MASS CONSERVATION EQUATIONS INVOLVING ADVECTION, DIFFUSION AND ION-MIGRATION
D. H. Ferriss and A. Turnbull Jun. 1982 24 p refs
(NPL-DMA(A)-44; ISSN-0143-7313) Copyright. Avail: Issuing Activity

A mathematical model which describes the solution composition and electrode potential in a corrosion fatigue crack in a steel cathodically protected in 3.5% NaCl was developed. The model consists of continuity and transport equations for four chemical species within the crack together with an electroneutrality equation. The electrochemical reaction is reduction of water on the walls and tip of the crack. The equations constitute a system of nonlinear parabolic partial differential equations. The numerical method which solves them is designed so that additional reactions can be introduced into the model. Author (ESA)

N83-10170* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MECHANICAL BONDING OF METAL METHOD
Bruce A. Banks, inventor (to NASA) 26 Nov. 1980 11 p Filed 26 Nov. 1980 Supersedes N81-16329 (19 - 07, p 0899)
(NASA-Case-LEW-12941-1; US-Patent-4,349,954; US-Patent-Appl-SN-210632; US-Patent-Class-29-458; US-Patent-Class-29-521; US-Patent-Class-403-282) Avail: US Patent and Trademark Office CSCL 11F

A method is disclosed for joining the surfaces of two metal structures in a mechanical bond. The joining process can be performed in either air or vacuum. The metal surfaces of the structures that are to be bonded are exposed to an ion beam together with a target of low sputtering yield material. This material deposits on the surfaces and creates sites of sputter resistance which evolve into peaks of a cone like surface microstructure. The textured metal surfaces are arranged in face to face relationship and compressed together with plastic deformation which mechanically interlocks the cone. A large interface area is produced

which minimizes thermal and electrical losses. Also, no electrical power or heat is required during metal joining.
Official Gazette of the U.S. Patent and Trademark Office

N83-10171*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
FRICTION AND WEAR OF IRON AND NICKEL IN SODIUM HYDROXIDE SOLUTIONS
George W. P. Rengstorff (Toledo Univ., Ohio), Kazuhisa Miyoshi, and Donald Buckley 1982 23 p refs Presented at the Joint Lubrication Conf., Washington D.C., 5-7 Oct. 1982; sponsored by ASME and American Society of Lubrication Engineers
(NASA-TM-82935; E-638; NAS 1.15:82935) Avail: NTIS HC A02/MF A01 CSCL 11F

A loaded spherical aluminum oxider rider was made to slide, while in various solutions, on a flat iron or nickel surface reciprocate a distance of 1 cm. Time of experiments was 1 hr during which the rider passed over the rider passed over the center section of the track 540 times. Coefficients of friction were measured throughout the experiments. Wear was measured by scanning the track with a profilometer. Analysis of some of the wear tracks included use of the SEM (scanning electron microscrope) and XPS (X-ray photoelectron spectroscopy). Investigated were the effect of various concentractions of NaOH and of water. On iron, increasing NaOH concentration above 0.01 N caused the friction and wear to decrease. This decrease is accompanied by a decrease in surface concentration of ferric oxide (Fe_2O_3) while more complex iron-oxygen compounds, not clearly identified, also form. At low concentrations of NaOH, such as 0.01 N, where the friction is high, the wear track is badely torn up and the surface is broken. At high concentration, such as 10 N, where the friction is low, the wear track is smooth. The general conclusion is that NaOH forms a protective, low friction film on iron which is destroyed by wear at low concentrations but remains intact at high concentrations of NaOH. Nickel behaves differently than iron in that only a little NaOH gives a low coefficient of friction and a surface which, although roughened in the wear track, remains intact. B.W.

N83-10172*# Boeing Commercial Airplane Co., Seattle, Wash.
SERVICE EVALUATION OF ALUMINUM-BRAZED TITANIUM (ABTI) JET ENGINE TAILPIPE EXTENSIONS Final Report
S. D. Elrod Washington NASA Sep. 1982 12 p refs
(Contract NAS1-13681)
(NASA-CR-3617; NAS 1.26:3617; D6-51416) Avail: NTIS HC A02/MF A01 CSCL 11F

Aluminum-brazed titanium (ABTi) jet engine tailpipe extensions were evaluated in commercial service over a 3-year period. The purpose of the evaluation was to determine the corrosion resistance of ABTi in acoustic applications (i.e., honeycomb sandwich incorporating a perforated inner skin). The results showed that ABTi does not have acceptable corrosion resistance in acoustic applications under severe operating conditions, but may be acceptable for acoustic applications in less severe environments.
Author

N83-10173# Aeronautical Research Labs., Melbourne (Australia).
THE EFFECT OF WATER DISPLACING CORROSION PREVENTIVES ON STRESS CORROSION CRACKING OF ALUMINIUM ALLOY 7075-T651
L. Wilson and R. S. G. Devereux Mar. 1982 8 p refs
(ARL-MAT-NOTE-132; AR-002-341) Avail: NTIS HC A02/MF A01

The effectiveness of some commercial water displacing corrosion preventive formulations in inhibiting stress corrosion cracking of 7075-T651 aluminum alloy was investigated. Examples of three types of protective agents, viz. oily films, soft (grease like) films, and hard (resin like) films were used and all were found to be effective in reducing rates of stress corrosion crack growth in laboratory tests. A.R.H.

N83-10174*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
A CRITICAL STUDY OF THE ROLE OF THE SURFACE OXIDE LAYER IN TITANIUM BONDING Semiannual Technical Report
S. Dias and J. P. Wightman Oct. 1982 14 p refs
(Grant NAG1-252)
(NASA-CR-169457; NAS 1.26:169457) Avail: NTIS HC A02/MF A01 CSCL 11F

The molecular understanding of the role which the surface oxide layer of the adherend plays in titanium bonding is studied. The effects of Ti6-4 adherends pretreatment, bonding conditions, and thermal aging of the lap shear specimens were studied. The use of the SEM/EDAX and ESCA techniques to study surface morphology and surface composition was emphasized. In addition, contact angles and both infrared and visible reflection spectroscopy were used in ancillary studies. S.L.

N83-10175# Defence Research Information Centre, Orpington (England).
FEATURES OF THE STRUCTURE OF LARGE FORGE INGOTS MADE FROM STEEL WITH DIFFERENT IMPURITY CONTENT
V. S. Dub, A. S. Loboda, N. A. Khlyankov, V. V. Krasinskii, V. A. Litvak, A. V. Gorskii, L. K. Pykhtar, G. A. Pimenov, and V. E. Klyucharav Jul. 1982 8 p Transl. into ENGLISH of Conf. paper from the Steel Casting Process. Conf. (USSR), 1981 pp 86-89 Conf. held in Moscow, 1981
(DRIC-T-6708; BR83954) Avail: NTIS HC A02/MF A01

Crystallization parameters and the kinetics of solid phase formation for large forge 147 ton ingots, vacuum cast from chromium-nickel molybdenum steel, were studied. The macrostructure and physical and chemical properties of ingots with normal and reduced levels of impurities were also studied. It was found that a decrease in impurity content reduced the temperature range at which solidification took place, raised the temperature of the solidus, and increased the rate of formation of the solid phase following cyrstallization. The observed changes in parameters and kinetics of crystallization lead to an improvement in the macrostructure and homogeneity of large forge ingots.
Author (ESA)

N83-10176# Brown Univ., Providence, R. I. Div. of Engineering.
AN INVESTIGATION OF INTERFACIAL REACTIONS IN METAL MATRIX COMPOSITES Final Report, 1 Apr. 1980 - 30 Jun. 1981
Watertown, Mass. Army Materials and Mechanics Research Center Mar. 1982 34 p refs
(Contract DAAG46-80-C-0027; DA Proj. 1L2-63102-D-071)
(AD-A117741; AMMRC-TR-82-14) Avail: NTIS HC A03/MF A01 CSCL 11/4

The interfacial reaction between fibre and matrix materials was studied in G/Al and FP/Mg composite systems. An intermediate layer of reaction product was necessary to prevent debonding in G/Al composites during cooling from the fabrication temperature. The intermediate layer was identified as the spinel $MgAl_2O_4$ in the FP/Mg composite and the effect of this intermediate layer was to provide good bonding and load transfer from matrix to fibre and also to form bridges (necks) cross-linking the fibres. The spinel also acted as a diffusion barrier to reduce the role of fibre degradation by interfacial reaction at service temperatures.
Author (GRA)

N83-10177# Pacific Northwest Lab., Richland, Wash.
ELECTROLESS NICKEL AND ION-PLATED PROTECTIVE COATINGS FOR SILVERED GLASS MIRRORS
M. A. Lind, D. A. Chaudiere, L. S. Dake, and T. L. Stewart Apr. 1982 36 p refs
(Contract DE-AC06-76RL-01830)
(DE82-015034; PNL-4257) Avail: NTIS HC A03/MF A01

Two methods of protecting second surface silvered glass mirrors from environmental degradation are discussed. One method employed silver mirrors overcoated with Al, Ni, 304 stainless steel, Cr, or an Al/Cu alloy prepared by ion plating. The other method used conventional wet process silver mirrors protected with a thin electroless nickel coating. These experimental mirrors were compared with conventional paint backed silver/copper mirrors after exposure to elevated temperatures and water vapor in order

to estimate their relative environmental stability. The electroless nickel mirrors showed consistently more resistance to these stresses than either the conventional or ion plated mirrors, suggesting that they may provide more durable field service. DOE

N83-10178# Sheffield Univ. (England). Dept. of Control Engineering.
SELF-TUNING MULTI-STEP PREDICTION OF STRENGTH INDEX IN AN IRON-ORE SINTERING PROCESS
P. P. Kanjilal and E. Rose May 1982 7 p refs Presented at IEEE Conf. on Appl. of Adaptive and Multivariable Control, Hull, England, Jul. 1982
(RR-183) Avail: NTIS HC A02/MF A01

A method which predicts sinter strength index (ISO) with reasonable accuracy several hours in advance is presented. The sintering process is characterized by a discrete time stochastic model, using ISO records and coke percentage in the raw mix. Practical results show that the prediction is quasi-optimal, even before convergence is achieved. For a total plant time of 150 hr, prediction error is within + or - 0.75, for an ISO reading of 75.
Author (ESA)

N83-10179# Sheffield Univ. (England). Dept. of Control Engineering.
IMPROVED SPEED CONTROL LAW FOR A SINTER STRAND PROCESS
E. Rose and P. P. Kanjilal May 1982 6 p refs Presented at 3rd IFAC Symp. on Control of Distributed Parameter Systems, Toulouse, Jun.-Jul. 1982
(RR-184) Avail: NTIS HC A02/MF A01

A feedforward control scheme which minimizes the waste product from a sinter strand process by manipulating strand speed is considered. The results of simulation exercises in which the sinter bed is assumed to be composed of a series of lumped sections are discussed. The velocity of the flame-front within a section was assumed to be nonlinear and initially proportional to the raw-mix permeability. Permeability data from plant were used as input. Control laws were based on straight and weighted averaging of ideal section speeds. The proposed control law involves a technique for modifying the time-shift increments associated with the straight-average law. The reduction in output waste from the strand when the law is used is clearly demonstrated.
Author (ESA)

N83-10180# Battelle Columbus Labs., Ohio.
POTENTIAL EFFECT OF FERROUS SCRAP COMPOSITION ON THE QUALITY OF IRON AND STEEL COATINGS Minerals Research Contract Report, Aug. 1980 - Nov. 1980
W. L. Swager, R. W. Lownie, Jr., and C. E. Mobley Nov. 1981 226 p refs
(Contract DI-BM-J0-205002)
(PB82-194184; BM-OFR-37-82) Avail: NTIS HC A11/MF A01 CSCL 11F

Tramp (undesirable) elements introduced into iron and steel castings through purchased ferrous scrap are evaluated as to their likely degree of future threat to the quality of castings. Conclusions are based on analysis of literature and on nonmail surveys of foundries, scrap processors, trade and technical associations, and others. The existing tramp element problem is expected to be persistent, but amenable to improved control by foundries and their suppliers. Four recommendations for action are given. GRA

N83-10181# National Building Research Inst., Pretoria (South Africa).
CORROSION OF ARCHITECTURAL AND STRUCTURAL METALS AND METAL COATINGS IN SOUTH AFRICA
1982 28 p refs
(PB82-185869) Avail: NTIS HC A03/MF A01 CSCL 11F

The results of extensive, long-term atmospheric corrosion programs to evaluate the performance of metals, alloys and metal coatings are discussed. Results from exposure sites throughout the country are given. GRA

N83-10182# National Building Research Inst., Pretoria (South Africa).
THE USE OF THERMAL SPRAYED COATINGS TO COMBAT ATMOSPHERIC CORROSION IN THE BUILDING AND CONSTRUCTION INDUSTRY
Jan Smuts and B. G. Callaghan 26 Oct. 1978 21 p refs
(PB82-185836) Avail: NTIS HC A02/MF A01 CSCL 11F

The role played by metallic coatings in the protection of steel is discussed with special emphasis being placed on the thermal spraying of zinc and aluminum coatings. The advantages and disadvantages of these coatings, as compared to other forms of steel protection, is discussed in detail. The performance of conventional paint coatings applied to a thermally sprayed substrate, is also covered.
Author (GRA)

N83-10183# Technical Research Centre of Finland, Espoo.
THE MEASUREMENT OF THE CLEAVAGE FRACTURE STRENGTH BY MEANS OF AN INSTRUMENT IMPACT TEST
Heikki Kotillainen and Erkki Sirkkola Mar. 1981 23 p refs
(PB82-206806; TIEDONANTO-84) Avail: NTIS HC A02/MF A01 CSCL 11F

A mild steel, Fe52D is discussed. The measurements consisted of static tensile tests and instrumented Charpy V-notch tests. The fracture initiation resistance was measured and it was concluded that the shelf energies give too optimistic estimate on the initiation resistance. At the lowest temperature, at which any stable crack growth at the notch tip was observed, the general yield strength and the fracture strength coincided. This coincidence allows one to calculate the cleavage fracture strength of the material. An estimate for the cleavage fracture strength can also be derived by using the static yield strength data. This estimate agrees reasonably well with the above mentioned calculated cleavage fracture strength.
Author (GRA)

N83-10184# Association of Indian Drop Forcing and Stamping, Bombay.
SEMINAR ON HEAT TREATMENT AND METALLURGICAL QUALITY CONTROL OF FORGINGS
Feb. 1982 64 p refs Seminar held in Bombay, 20 Feb. 1982
(PB82-209438) Avail: NTIS HC A04/MF A01 CSCL 13H

The proceedings contain papers on: The role of metallurgical factors on dropping behavior of billets and bars for forging applications is discussed. Metallurgical quality requirements of automative forgings, metallurgical concepts & developments of heat treatment of steel forgings, heat treatment as a tool to combat steel quality constraints in the forging industry and quality problems in steel forgings- a users view, metallurgical quality assurance requirements for automobile forgings are also discussed. GRA

N83-10185# Bureau of Mines, Albany, Oreg.
ANALYSIS OF VAPOR ALUMINUM DIFFUSED STAINLESS STEELS
L. L. Oden, M. P. Krug, and R. A. McCune Mar. 1982 18 p refs
(PB82-202268; BM-RI-8629) Avail: NTIS HC A02/MF A01 CSCL 11F

Specimens of a ferritic alloy and austenitic alloys types 316 and 310 were treated by a proprietary vapor-aluminum diffusion process and a dual vapor-aluminum diffusion process. Comprehensive metallographic, X-ray, and electron microprobe analyses were conducted. Dual treatment increased the quantity of aluminum per unit area by a factor of two and increased the depth of penetration by a factor of three. The aluminum-diffused region of the ferritic alloy was single-phase alpha Fe solid solution that was ordered on the surface, whereas two distinct diffusion layers were observed on the austenitic alloys. The outer layer comprised alpha Fe solid solution that was ordered on the surface, and the inner layer was a two-phase mixture of alpha Fe solid solution and the intermetallic compound AlNi.
M.G.

N83-10186# Bureau of Mines, Minneapolis, Minn.
HIGH-TEMPERATURE CORROSION RESISTANCE OF BASIC REFRACTORIES TO COAL AND LIGNITE ASH SLAGS
J. E. Pahlman, C. F. Anderson, and S. E. Khalafalla Mar. 1982

17 p refs
(PB82-201351; BM-RI-8633) Avail: NTIS HC A02/MF A01 CSCL 11B

The resistance of basic refractories to corrosion by ash slags that would result from the burning of coal and lignite in metallurgical operations was determined. Basic refractories are of economic interest because they are from one-third to one-half as expensive as 90- to 99-pct-alumina refractories. Static tests were performed at 1,300 C and dynamic tests at 1,400 to 1,650 C to investigate the stability of refractory specimens in a slag environment. GRA

N83-10187# Bureau of Mines, Avondale, Md.
EFFECT OF FERRIC ION ON CORROSION RESISTANCE OF ZIRCONIUM IN HCl-AlCl3 ENVIRONMENT
William D. Riley and Bernard S. Covino, Jr. Feb. 1982 25 p refs
(PB82-194895; BM-RI-8610) Avail: NTIS HC A02/MF A01 CSCL 11F

Corrosion studies were conducted in HCl-AlCl2-FeCl4 environments in order to evaluate the corrosion resistance of zirconium in mineral extraction processes such as the clay-hydrochloric acid leaching process for extracting Alumina. A series of weight loss and electrochemical tests was conducted at 25 C and 65 C in aluminum chloride plus hydrochloric acid solutions containing 0 to 1,000 ppm ferric ion. It was determined that zirconium, which normally exists in a passive state in chloride-containing solutions, undergoes pitting attack in solutions containing more than 100 ppm of ferric ion. It is also shown that an oxide film prepared in air at high temperature offers protection in acid solutions containing levels of ferric ion from 300 ppm to 1,000 ppm. GRA

N83-10188# Bureau of Mines, Reno, Nev.
RECOVERY OF METAL VALUES FROM LEAD SMELTER MATTE BY CHLORINE-OXYGEN LEACHING
D. L. Pool, B. J. Scheiner, and S. D. Hill Feb. 1981 25 p refs (PB82-194903; BM-RI-8615) Avail: NTIS HC A02/MF A01 CSCL 11F

A hydrometallurgical technique to recover copper, lead, nickel, and cobalt from lead smelter matter was investigated. The metals were converted from insoluble sulfides to soluble chlorides using a HCl-Cl2-O2 leaching system. Parameters studied in a 50-gallon, glass-lined reactor were the ratio of hydrochloric acid to chlorine, chlorine consumption per pound of matte, oxygen reaction pressure, and temperature. The matte material used contained, in percent, 19.7 Cu, 52 Pb, 2.9 Ni, 1.5 Fe, 0.38 Co, 0.19 As, 0.41 Zn, and 0.12 Cd. Extraction of Cu, Pb, Ni, Co, and Cd ranged from 92 to 98 pct, with concomitant extractions of Fe and As of < 0.1 pct. The Cu and Pb were recovered as electrowon metals, while the Ni, Co, and Cd were recovered as mixed hydroxides. GRA

N83-10189# Bureau of Mines, Reno, Nev.
IMPROVEMENTS IN HEAP LEACHING TO RECOVER SILVER AND GOLD FROM LOW-GRADE RESOURCES
G. E. McClelland and J. A. Eisele Feb. 1982 33 p
(PB82-193434; BM-RI-8612) Avail: NTIS HC A03/MF A01 CSCL 11F

A particle agglomeration technique was investigated as a means for improving the flow of leaching solution through heaps of clay or finely crushed, low grade, gold-silver ores. Bench and pilot scale experiments showed that the percolation rate of cyanide leaching solution was markedly enhanced by mixing the ore with a portland cement binder, moistening the mixture, and mechanically agglomerating and aging the feed prior to heap building and leaching. The rate of gold and silver recovery markedly increased because of the increased, uniform percolation of leaching solution through the agglomerated feed. The use of concentrated cyanide solution instead of water during the agglomeration procedure decreased the leashing time required to obtain maximum recovery. GRA

N83-10190# Bureau of Mines, Avondale, Md.
ELECTROCHEMICAL STUDIES OF PLATINUM-GROUP METALS IN MOLTEN ALKALI METAL CYANIDES
D. R. Flinn and C. L. Manger Mar. 1982 22 p refs
(PB82-202243; BM-RI-8656) Avail: NTIS HC A02/MF A01 CSCL 11C

The Bureau of Mines has studied the electrochemical parameters important to the preparation of coatings of the platinum-group metals. Using molten mixtures of sodium and potassium cyanides in an inert atmosphere techniques were developed that permit the preparation of baths for platinum, rhodium, and iridium electrodeposition. Cyclic voltametric and slow sweep rate linear polarization techniques were utilized to determine optimum potential and current values for preparation of plating baths and for the electrodeposition of coatings. Techniques are described for the deposition of platinum and rhodium coatings at near 100 percent anode and cathode current efficiencies, and for iridium at approximately 80-percent efficiency. Palladium deposition from these molten cyanide baths remains unsatisfactory. The chemistry of the palladium containing cyanide bath is discussed. Examples of scanning electron microscopy photomicrographs of typical platinum coatings are presented. Techniques are described for the preparation of platinum coatings on large objects. Author

N83-10191# Bureau of Mines, Boulder City, Nev. Engineering Lab.
ALUMINUM CHLORIDE HEXAHYDRATE CRYSTALLIZATION BY HCl GAS SPARGING
J. H. Maysilles, D. E. Traut, and D. L. Sawyer, Jr. Jan. 1982 45 p refs
(PB82-177353; BM-RI-8590) Avail: NTIS HC A03/MF A01 CSCL 11F

One of the more promising technologies being investigated to recover alumina from domestic resources is the hydrochloric acid leaching of kaolinitic clay. In the hydrochloric acid leaching technology, alumina is recovered from iron-free aluminum chloride leach liquor and separated from impurity elements sparging the liquor with hydrochloric gas to crystallize aluminum chloride hexahydrate (ACH). A large-scale crystallizer with a 336 gallon usable volume was constructed and operated to obtain engineering and design data for potential scale up and to demonstrate the ability of the technology to produce specification grade alumina. Test campaigns involving about 1,400 hours of operation were completed. ACH meeting all chemical purity requirements could not be produced by a single crystallization, but was produced by recrystallizing the product from the calcined kaolin clay leach liquor. Author (GRA)

N83-10192# Indian Copper Information Centre, Calcutta.
COPPER POWDER AND CHEMICALS: EDITED PROCEEDINGS OF A SEMINAR
Dec. 1980 114 p refs Seminar held in Calcutta, Dec. 1980 Sponsored in cooperation with Hindustan Copper Ltd. and Indian Inst. of Metals
(PB82-206202) Avail: NTIS HC A06/MF A01 CSCL 11F

Various papers are presented covering the following topics: Status of Copper Chemical Industry in India; Copper Powder from Industrial Wastes; Manufacture of Cooper Hydroxide and High Grade Cement Copper from Low Grade Copper Ore; Manufacture of Copper Sulphate as a By-Product; Hydrometallurgical Treatments of Copper Converter and Smelter Slage for Recovering Copper and other Non-Ferrous Metals; Recovery of Copper from Dilute Solutions; Use of Copper Compounds as Fungicides in India; Copper in Animal Husbandry; and Use of Copper Powder and Chemicals for Marine Applications. The keynote paper given at the Seminar was on Conservation of Copper for Better Use.
Author

27 NONMETALLIC MATERIALS

Includes physical, chemical, and mechanical properties of plastics, elastomers, lubricants, polymers, textiles, adhesives, and ceramic materials.

N83-10193 Carnegie-Mellon Univ., Pittsburgh, Pa.
STUDIES ON THE THERMODYNAMIC, RHEOLOGICAL AND

RHEO-OPTICAL PROPERTIES OF A RIGID ROD POLYMER IN SOLUTION Ph.D. Thesis
Subramanian S. Venkatraman 1981 232 p
Avail: Univ. Microfilms Order No. DA8204170

The equilibrium, steady state and time dependent properties of a rod-like polymer, polybisbenzothiazole, in methane sulfonic acid was studied. The effects of temperature and concentration on the transition to a liquid crystalline solution were explored for polymers of differing intrinsic viscosities. The phase diagrams were very similar for all the polymers. The critical concentration for the conversion to a nematic state was temperature dependent; the coexistence region was very narrow. Disparity between the observed and predicted phase behavior was examined on the basis of intermolecular association effects. Steady state rheological and rheo-optical properties were studied for concentrated and semidilute solutions. The shear rate dependence of the steady state viscosity and recoverable compliance was similar to that found for solutions of flexible polymers, but the concentration dependence of these properties (at vanishing shear rate) was different from that observed for flexible chain polymers.
Dissert. Abstr.

N83-10194*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
PLASMA DEPOSITION AND SURFACE MODIFICATION TECHNIQUES FOR WEAR RESISTANCE
T. Spalvins 1982 19 p refs Presented at the Joint Lubrication Conf., Washington, D.C., 5-7 Oct. 1982; sponsored by ASME and American Society of Lubrication Engineers
(NASA-TM-82972; E-1399; NAS 1.15:82972) Avail: NTIS HC A02/MF A01 CSCL 20I

The ion-assisted or plasma coating technology is discussed as it applies to the deposition of hard, wear resistant refractory compound films. Of the many sputtering and ion plating modes and configurations the reactive magnetron sputtering and the reactive triode ion plating techniques are the preferred ones to deposit wear resistant coatings for tribological applications. Both of these techniques incorporate additional means to enhance the ionization efficiency and chemical reaction to precision tailor desirable tribological characteristics. Interrelationships between film formation, structure, and ribological properties are strictly controlled by the deposition parameters and the substrate condition. The enhanced ionization contributes to the excellent adherence and coherence, reduced internal stresses and improved structural growth to form dense, cohesive, equiaxed grain structure for improved wear resistance and control. Author

N83-10195*# PCR, Inc., Gainesville, Fla.
SYNTHESIS OF PERFLUORINATED POLYETHERS Final Report, 1 Apr. 1974 - 31 Jul. 1977
Ralph J. DePasquale, Calvin D. Padgett, Jerry R. Patton, and Theodore Psarras Sep. 1982 94 p refs
(Contract NAS2-8156)
(NASA-CR-166409; NAS 1.26:166409) Avail: NTIS HC A05/MF A01 CSCL 11G

A series of highly fluorinated acetylenes was prepared and their cyclization reactions were studied. A series of perfluoropolytriazines with -CF2I pendent groups were prepared. These materials can be cured thermally or photochemically to an elastomeric gum. Perfluoropolytriazines with -CN pendent groups were prepared. These materials can be crosslinked by reaction with terephthalonitrile oxide. Author

N83-10196*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Chemistry.
SURFACE ANALYSIS IN COMPOSITE BONDING Semiannual Technical Report
D. L. Messick and J. P. Wightman Oct. 1982 12 p refs
(Grant NAG1-248)
(NASA-CR-169456; NAS 1.26:169456) Avail: NTIS HC A02/MF A01 CSCL 11A

The role of the interfacial region in determining the bond strength and durability of composite bonds is discussed. The characterization of a variety of carbon fibers including Celion 6000 using both scanning electron microscopy and X-ray photoelectron spectroscopy is discussed. The emphasis is on composite bonding, that is, the adhesive bonding between composites in contrast to fiber-matrix interaction. The primary objective of the research is the characterization of composite surfaces before adhesive bonding and after fracture of bonded specimens. Work done on the analysis of composite samples pretreated in a number of ways prior to bonding is detailed. R.J.F.

N83-10197# Sandia Labs., Albuquerque, N. Mex.
QUASIELASTIC LIGHT SCATTERING FROM DILUTE AND SEMIDILUTE POLYMER SOLUTIONS
Dale W. Schaefer and Charles C. Han Apr. 1982 121 p refs
(DE82-016806; SAND-82-0825) Avail: NTIS HC A06/MF A01

The use of photon correlation spectroscopy to enhance understanding of the statistical properties of chain molecules in solution is demonstrated. For simplicity the single chain problem is treated before adding the complicating effects of interchain interactions and entanglements. The dynamics of a single polymer chain are complex with many possible approaches to the problem. Therefore this subject is first treated in a simplified manner employing scaling ideas and later in more detail and rigor using the Zwanzig-Mori formalism. In both cases the renormalization or blob concept is introduced to interpret subtle aspects of the molecular weight dependence of the dynamics of a single chain. After the single chain problem, the virial regime is briefly reviewed. The discussion of the virial regime naturally leads to consideration of semidilute solutions. DOE

N83-10198# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Cologne (West Germany). Inst. fuer Werkstoff-Forschung.
INTERPRETATION OF SUBCRITICAL CRACK GROWTH IN CERAMIC MATERIALS
Theo Fett and Dietrich Munz (Karlsruhe Univ., West Germany) Mar. 1982 50 p refs In GERMAN; ENGLISH summary
(DFVLR-FB-82-07) Avail: NTIS HC A03/MF A01

A derivation of the power law of subcritical crack growth in ceramic materials, based on bond cracking by thermal interactions, is presented. The potential barriers, which hinder bond cracking and renewed bond healing, are calculated by application of the Morse potential and the Lennard-Jones potential formulas. In cases of linear elastic behavior, a simple model leads to the crack growth velocity. The exponent of the power law is inversely proportional to the temperature. Author (ESA)

N83-10199# National Bureau of Standards, Washington, D.C. Center for Materials Science.
AN INTRODUCTION TO CHEMILUMINESCENCE METHODS FOR LUBRICANT OXIDATION STUDIES Interim Report, 19 Mar. 1981 - 31 Mar. 1982
D. B. Clark, S. J. Weeks, and S. M. Hsu Apr. 1982 41 p refs
(PB82-207515; NBSIR-82-2490) Avail: NTIS HC A03/MF A01 CSCL 11H

An introductory review of chemiluminescence (CL) techniques describes applications for the study of oxidation of fuels and lubricants. Reviews of chemiluminescence and oxidation are briefly discussed. The mechanism of CL as it applies to complex hydrocarbon systems is discussed. Several steady state and nonsteady state kinetic methods are discussed with respect to the ability of each technique to give useful information about the kinetics and mechanisms of oxidation. Applications of CL techniques for fuels and lubricants, as well as simple hydrocarbon systems, are discussed. The unique properties of CL methods for materials testing (e.g. lubricant oxidation stability) as well as fundamental understanding of chemical oxidation reactions are emphasized. Studies which evaluate petroleum and synthoil products, oxidation inhibitors and metal catalysts are discussed.

Instrumentation capabilities are reviewed and critical features of instrumental design are discussed. GRA

N83-10200# National Bureau of Standards, Washington, D.C. Center for Analytical Chemistry.
LOW MOLECULAR WEIGHT LEACHABLES FROM MEDICAL GRADE POLYMERS Final Report, Apr. 1981
B. F. Howell, S. Chesler, L. Hilpert, and D. J. Reeder Apr. 1982 36 p refs Sponsored by Food and Drug Administration
(PB82-105766; NBSIR-81-2436) Avail: NTIS HC A03/MF A01 CSCL 11I

Four medically important polymeric materials (silicone polymer from mammary prostheses, polyurethane, polyethylene, and polycarbonate) were placed in contact with water for time periods ranging from four hours to seven days. Substances leaching into water were separated by extraction with methylene chloride, or by evaporation of water, and identification of species in the leachate was attempted by a number of analytical techniques, with extensive use of combined gas chromatography/mass spectrometry (GC/MS). Low molecular weight fragments of dimethylsiloxane were identified from mammary prosthesis gel. Spectra are also included for leachate from the other three polymers; identification of these compounds is still in process. Prolyl hydroxylase and tritium labeled protocollagen substrate were prepared from chick embryos, and an enzyme activity assay system was developed with use of Bio-Rad AG 50W-X8 cation exchange resin. No effect on enzyme activity was seen when silicone gel leachate was added to the assay mixture. Author (GRA)

N83-10201# Oil Technologists Association of India.
NATIONAL SEMINAR ON CURRENT ADVANCES IN THE TECHNOLOGY OF OILS AND ALLIED PRODUCT
Feb. 1982 62 p refs Proceeding of the 37th Ann. Conv. of Oil Technologists' Association of India, Kanpur, 13-14 Feb. 1982 Sponsored by Harcourt Butler Technological Inst., State Council of Science and Technol., Council of Scientific and Industrial Research, Indian Council of Agricultural Research, and Directorate of Industries U.P.
(PB82-218124) Avail: NTIS HC A04/MF A01 CSCL 11H

Water soluble polymeric binders for surface coating and performance of paints in economic growth are discussed. Edible as well as nonedible oils are also discussed. S.L.

N83-10202# Science Research Council, Chilton (England).
THE CONNECTIVITY OF POLYMER NETWORKS BY NEUTRON SCATTERING AND A STATISTICAL THEORY OF HARD ROD NEUMATIC FLUIDS
M. Warner Aug. 1982 25 p refs Presented at Oak Ridge, Tenn., Apr. 1982
(PB82-208554; RL-82-015) Avail: NTIS HC A02/MF A01 CSCL 07D

The necessary configurational and dynamic properties of polymer chains are reviewed in order to present a theory of polymer dynamics of chains with varying topology. At the same time the quasi elastic neutron scattering cross sections are simply developed. Their unusual form is slightly modified by the topology of linkage in a gel. The sophistication of neutron dynamical experiments is such as to enable experiment, via the calculations presented, to distinguish the different characters of links. Long molecules of low flexibility rods are discussed. Because of the subtle interplay between rotational and translational freedom, rods form ordered fluids. Nematic liquids are discussed initially by reviewing their molecular, thermal and symmetry properties. A simple theory of the packing of hard rods in limited volume, together with the effects of soft forces between molecules, leads to a wide variety of predictions of ordering and the nematic isotropic phase transitions. GRA

N83-10203# National Timber Research Inst., Pretoria (South Africa).
TANNIN ADHESIVES: FROM LABORATORY TO INDUSTRY
H. G. Scharfetter and A. Pizzi 1981 13 p refs Presented at the 17th IUFRO World Cong., Wood Gluing Working Party, Kyoto, 6-17 Sep. 1981
(PB82-206814) Avail: NTIS HC A02/MF A01 CSCL 11A

The past research program on tannin-based adhesives, the research achievements attained and their translation into industrial application, as well as cost and technical advantages of tannin adhesives in current industrial use are discussed. In particular, the objectives leading to the establishment of such a research program such as the need to reduce dependence on imported raw materials, to lower adhesives cost, to improve adhesives availability, and to improve adhesives properties, as well as the manner in which such objectives were pursued, results obtained and the degree of industrial success achieved are discussed in detail. Author

N83-10204# Illinois Inst. of Tech., Chicago.
SURFACE EMBRITTLEMENT OF POLYETHYLENE PIPE GRADE RESIN Final Report, 1 Sep. 1979 - 31 Oct. 1980
Lawrence J. Broutman 31 Nov. 1981 54 p Sponsored by Gas Research Inst.
(PB82-214370; GRI-81/0030) Avail: NTIS HC A04/MF A01 CSCL 11I

Techniques were developed to simulate the effect of a brittle surface on the mechanical behavior of polyethylene. Polyethylene films were exposed to ultraviolet radiation so as to degrade them. These films were than heat fused to polyethylene substrates. It was demonstrated that specimens having bonded films on their surface were embrittled. In addition to attempting to simulate naturally embrittled surfaces by bonding of brittle films to the polyethylene substrate, specimens of polyethylene were subjected to U.V. radiation to determine the effect of surface embrittlement. Severe embrittlement was demonstrated by measuring tensile ultimate strain to failure which was much more sensitive to embrittlement than conventional impact strength. Additional experiments were conducted utilizing sharp razor notches of various depths in surface of polyethylene to evaluate their effect on tensile strain to failure. Experiments were conducted as a function of strain rate which has been demonstrated to have a strong influence on thenotch length required to cause embrittlement. It is shown that the notch length required to cause embrittlement is greater than the film thickness required to cause embrittlement. It has also been shown that U.V. exposure of the polyethylene surface increases the degree of crystallinity and hence establishes a residual stress state in the exposed polymer which has been measured by curvature techniques. Author

N83-10205# Pennsylvania Univ., Philadelphia. Dept. of Materials Science and Engineering.
THE EFFECTS OF GASEOUS ENVIRONMENTS ON THE MECHANICAL FAILURE OF POLYETHYLENE PIPE MATERIALS Annual Technical Report, 1 Nov. 1980 - 31 Oct. 1981
Norman Brown, Eiichi Kamei, and John L. Bassani 26 Oct. 1981 44 p refs
(GRI-5080-363-0382)
Avail: NTIS HC A03/MF A01 CSCL 11I

Polyethylene gas piping is expected to be in service for times on the order of 50 years depending on service conditions. Therefore research on piping materials and pipes has two principal objectives: (1) developing methods for predicting when a pipe will fail and (2) improving the material for piping. The prediction of long time failure hinges on the development of short time test methods which relate to long time failure. The improvement in the behavior of current materials also hinges on the use of test methods of short duration relative to the anticipated life time of the pipe in service. One of the primary criterion for an acceptable test method is that it produces the same type of failure as is observed after long time failure in service. It has been found that P.E. pipe material fails in a brittle mode after long periods of time. The failure mode is called brittle because there is little macroscopic deformation throughout the pipe; however microscopic observations of the fractured surface shows a state of large deformation which is highly localized in the vicinity of the fractured surfaces. Author

28 PROPELLANTS AND FUELS

Includes rocket propellants, igniters, and oxidizers, storage and handling; and aircraft fuels.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power,* and *44 Energy Production and Conversion.*

N83-10206 City Univ. of New York, N. Y.
THE HEAT CAPACITY OF COAL CHARS Ph.D. Thesis
Wei-Yeong Wang 1982 168 p
Avail: Univ. Microfilms Order No. DA820333

During pyrolysis, the solid phase of coal is transformed into a microcrystalline structure with some extent of graphite-like orderliness. It is of interest to determine the thermodynamics of this structure which is believed to be process and coal origin dependent. This study was undertaken to elucidate the effect of the various factors on the heat capacity of coal chars. In order to assess the effect of coal rank and impurity content, several coals were obtained from the Pennsylvania State University Coal Bank. These selected starting materials were , a North Dakota lignite, an Illinois No.6 bituminous and a Virginia coking coal. The carbon content of these coals ranged from 59 to 75 wt% (mineral matter included). Half of each of the received coal sample was demineralized using a tandard procedure. Chars were prepared from the received and demineralized coals by pyrolysis. The heat capacity of these samples increases, in general, with increasing temperature and moisture content, and its behavior and order of magnitude are very similar to pure carbons when compared on a moisture free basis. The mineral matter content also affects the measured heat capacity. The thermally transformed mineral matter (ash) contriutes differently to the total heat capacity than the mineral matter in its original form. The moisture-containing coal seems to have higher heat capacity than expected by simple additive principle and shows a broad phase transition around ice point.
Dissert. Abstr.

N83-10207*# Midwest Research Inst., Kansas City, Mo.
EVALUATION OF METHODS FOR RAPID DETERMINATION OF FREEZING POINT OF AVIATION FUELS Final Report
B. Mathiprakasam Sep. 1982 105 p refs
(Contract NAS3-22543)
(NASA-CR-167981; NAS 1.26:167981; MRI-7014-G) Avail: NTIS HC A06/MF A01 CSCL 21D

Methods for identification of the more promising concepts for the development of a portable instrument to rapidly determine the freezing point of aviation fuels are described. The evaluation process consisted of: (1) collection of information on techniques previously used for the determination of the freezing point, (2) screening and selection of these techniques for further evaluation of their suitability in a portable unit for rapid measurement, and (3) an extensive experimental evaluation of the selected techniques and a final selection of the most promising technique. Test apparatuses employing differential thermal analysis and the change in optical transparency during phase change were evaluated and tested. A technique similar to differential thermal analysis using no reference fuel was investigated. In this method, the freezing point was obtained by digitizing the data and locating the point of inflection. Results obtained using this technique compare well with those obtained elsewhere using different techniques. A conceptual design of a portable instrument incorporating this technique is presented. J.D.

N83-10208*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LITERATURE SURVEY OF PROPERTIES OF SYNFUELS DERIVED FROM COAL Final Report
Francisco Flores Aug. 1982 187 p refs Presented at ASTM Symp. on alternate fuels and future fuels specifications for stationary gas turbine applications, Phoenix, Ariz., 9-10 Dec. 1981
(Contract DE-AI01-77ET-10350)
(NASA-TM-82739; E-1052; DOE/NASA/10350-30; NAS 1.15:82739) Avail: NTIS HC A09/MF A01 CSCL 21D

A literature survey of the properties of synfuels for ground-based turbine applications is presented. The four major concepts for converting coal into liquid fuels (solvent extraction, catalytic liquefaction, pyrolysis, and indirect liquefaction), and the most important concepts for coal gasification (fixed bed, fluidized bed, entrained flow, and underground gasification) are described. Upgrading processes for coal derived liquid fuels are also described. Data presented for liquid fuels derived from various processes, including H-coal, synthoil, solvent refined coal, COED, donor solvent, zinc chloride hydrocracking, co-steam, and flash pyrolysis. Typical composition, and property data is also presented for low and medium-BTU gases derived from the various coal gasification processes. M.G.

N83-10209# Materials Research Labs., Melbourne (Australia).
SEPARATION OF NITRATION BY-PRODUCTS IN COMMERCIAL-GRADE TRINITRO-TOLUENE BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY
Peter J. Sanders Jun. 1982 11 p refs
(MRL-TN-464; AR-003-041) Avail: NTIS HC A02/MF A01

Mixtures of several isomeric mononitro-, dinitro- and trinitrotoluenes were made up in toluene and analysed by HPLC techniques using reverse-phase, silica and amine columns and a variety of eluting solvents. A separation achieved on the silica column using dichloromethane/n-heptane as eluent under optimum conditions indicated that it could be used as a basis for further work in the analysis of production grade trinitro-toluene. Author

N83-10210# Ashland Petroleum Co., Ky. Research and Development Dept.
REFINING OF MILITARY JET FUELS FROM SHALE OIL. PART 1. PRELIMINARY PROCESS DESIGN, ECONOMIC AND YIELD OPTIMIZATION, AND COMPUTER MODELING Interim Technical Report, Feb. - Jun. 1979
C. Johnson, H. F. Moore, and W. A. Sutton Wright-Patterson AFB, Ohio AFWAL Apr. 1982 187 p refs
(Contract F33615-78-C-2080; AF Proj. 3048)
(AD-A117511; AFWAL-TR-81-2056-Pt-1) Avail: NTIS HC A09/MF A01 CSCL 21/4

Phase I work performed was directed at the preparation of an overall processing method based on the application of current refining techniques and an extraction process for the removal of nitrogen from shale oil. This preliminary process analysis was aimed at demonstrating technical as well as economic feasibility. This phase explored two overall processing methods, one providing JP-8 type aviation turbine fuel, the other method providing JP-4 type aviation turbine fuel. It was concluded that this process design offers the potential of producing high yields of aviation turbine fuels from shale oil with product costs competitive with or lower than comparable product slates from other shale refineries. Processing steps are provided that will minimize hydrogen consumption, provide a thermal efficiency greater than 70 percent, and produce residual fuel in quantities less than 10 percent of the total product slate. Author (GRA)

N83-10211# Suntech, Inc., Marcus Hook, Pa.
AN EXPLORATORY RESEARCH AND DEVELOPMENT PROGRAM LEADING TO SPECIFICATIONS FOR AVIATION TURBINE FUEL FROM WHOLE CRUDE SHALE OIL. PART 4: PRODUCTION OF SAMPLES OF MILITARY FUELS FROM RAW SHALE OILS Interim Report, 1 Apr. 1980 - 30 Nov. 1981
H. E. Reif, J. P. Schwedock, and A. Schneider Wright-Patterson AFB, Ohio AFWAL Feb. 1982 73 p Presented at the 3rd Jet Fuel From Shale Oil Technol. Rev., Miamisburg, Ohio, 17-18 Nov. 1981
(Contract F33615-78-C-2024; AF Proj. 2480)
(AD-A117526; AFWAL-TR-81-2087-Pt-4) Avail: NTIS HC A04/MF A01 CSCL 21/5

A total of 475 gallons of specification aviation turbine fuels (JP-4, JP-5 and JP-8) were prepared from Occidental Shale Oil based on Sun Tech's upgrading concept. Processing consists of six steps: (1) hydrotreating the whole shale oil to partially reduce total nitrogen content to minimize hydrogen consumption;

(2) distilling the hydrotreated product into appropriate fractions for additional processing; (3) rehydrotreating the light distillate fraction to meet product specifications; (4) treating the wide boiling gas oil fraction with anhydrous hydrogen chloride (HCl) which yields a low nitrogen content raffinate and a high nitrogen content extract phase; (5) thermally decomposing the extract to recover anhydrous HCl and a nitrogen-rich extract, which is used for generating hydrogen by partial oxidation; and (6) hydrocracking the raffinate phase to maximize aviation turbine fuel yield. Five 5-gallon samples of specification military fuels were produced from Paraho shale oil (JP-4, JP-5, JP-8, DF-2 and DF Marine) using a modified process. Processing consists of severely hydrotreating raw shale oil followed by fractionation and finally hydrocracking the wide boiling gas oil fraction to produce the desired product slate. GRA

N83-10212# JAYCOR, San Diego, Calif.
COMPUTER MODELING OF MIXING AND AGGLOMERATION IN COAL-CONVERSION REACTORS. VOLUME 1: MODEL FORMULATION Final Report, 15 Sep. 1978 - 28 Feb. 1982
R. K. C. Chan, M. J. Chiou, D. E. Dietrich, D. R. Dion, H. H. Klein, D. H. Laird, H. B. Levine, C. A. Meister, M. F. Scharff, and B. Srinivas Feb. 1982 125 p refs 2 Vol.
(Contract DE-AC21-78ET-10329)
(DE82-014836; DOE/ET-10329/1211-Vol-1; J510-82-007A/2112-Vol-1) Avail: NTIS HC A06/MF A01

The FLAG code consists of the following major modules: gas flow (including gas turbulence), gas phase chemistry, particle dynamics and energetics (including particle dispersion), particle chemistry (including devolatilization and heterogeneous reactions), particle collisions, agglomeration, and heat transfer (conduction and radiation). These physical chemical modules are embodied in computer subprograms. The distinction between a module and a subprogram is that the former is a conceptual division of the significant phenomena, whereas the latter is based on the ease of manipulation within the structure of the computer code. The basic solution procedure is a step by step integration of all the governing equations with respect to time, using a semiimplicit, second order accurate, finite difference scheme. In this procedure, the field variables, such as pressure, temperature, gas species concentration, velocity, etc. are evaluated at a finite set of spatial locations inside the reactor, as the time goes through a sequence of small, but finite increments. DOE

N83-10213# Cornell Univ., Ithaca, N. Y. Center for Radiophysics and Space Research.
STUDIES RELATED TO THE DEEP EARTH GAS Annual Report, Jan. - Dec. 1981
Thomas Gold, Elizabeth Bilson, and Steven Soter Mar. 1982 65 p refs
(Contract GRI-5081-360-0453)
(PB82-227653; GRI-81/0050) Avail: NTIS HC A04/MF A01 CSCL 21D

The origin of terrestrial hydrocarbons, principally of methane and petroleum was elucidated. Methane was successfully reacted with petroleum hydrocarbons. This reaction does occur at a measurable rate in the presence of natural clay catalysts at temperatures and pressures existing in the geological setting of petroleum formation. Upward migrating methane participates in petroleum formation. Evidence concerning regional patterns of hydrocarbon deposits, trace element content, the geologic setting of the deposits and the chemical and physical processes in the upper mantle and the crust, shows that methane from deep sources penetrated the crust in large quantities, and that this has contributed to the formation of much of the world's natural fuel supplies. GRA

N83-10214*# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Alternative Aviation Turbine Fuels, Aeronautics and Space Engineering Board.
AVIATION TURBINE FUELS: AN ASSESSMENT OF ALTERNATIVES Final Report
Apr. 1982 82 p refs
(Contract NASw-3522)
(NASA-CR-169395; NAS 1.26:169395; PB82-213737) Avail: NTIS HC A05/MF A01 CSCL 21D

The general outlook for aviation turbine fuels, the effect that broadening permissible aviation turbine fuel properties could have on the overall availability of such fuels, the fuel properties most likely to be affected by use of lower grade petroleum crudes, and the research and technology required to ensure that aviation turbine fuels and engines can function satisfactorily with fuels having a range of fuel properties differing from those of current specification fuel are assessed. Views of industry representatives on alternative aviation turbine fuels are presented. GRA

N83-10249# Sandia Labs., Albuquerque, N. Mex.
A THEORY FOR THE CALCULATION OF EXPLOSIVE DEPOSITION PROFILES FROM THE SPRAY PAINTING OF LIGHT INITIATED EXPLOSIVE
Floyd H. Mathews *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 189-204 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 21/4

31 ENGINEERING (GENERAL)

Includes vacuum technology; control engineering; display engineering; and cryogenics.

N83-10215 Illinois Univ., Urbana-Champaign.
FIELD INJECTION ELECTROSTATIC SPRAYING OF LIQUID HYDROGEN Ph.D. Thesis
James Patrick Woolsey 1981 103 p
Avail: Univ. Microfilms Order No. DA8203642

Uniform charged liquid hydrogen drops have been produced using two different generating techniques. These two techniques are Rayleigh's method of uniform droplet production in conjunction with field injection charging and field injection electrostatic spraying. The first method consists of applying a pressure drop across a glass capillary (nozzle) and thereby forming a smooth jet of liquid hydrogen. An acoustic wave of sufficient amplitude is then applied to the jet, which results in uniform drops at a frequency equal to the frequency of the acoustic wave. Charge is then injected into the jet through field ionization. This is accomplished by applying a high potential to a very sharp tungsten needle which protrudes slightly out of the nozzle. The end result is the formation of uniform charged liquid hydrogen drops. The second method consists of forming a liquid hemisphere of hydrogen at the end of a glass nozzle. Dissert. Abstr.

N83-10216# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION BULLETIN. PART 1: KEYNOTE ADDRESS, INVITED PAPERS, DAMPING AND ISOLATION, FLUID-STRUCTURE INTERACTION
May 1981 232 p refs Proc. of the 51st Symp. on Shock and Vibration, San Diego, Calif., 21-23 Oct. 1980; sponsored by NOSC 3 Vol.
(AD-D432836; Bull-51-Pt-1) Avail: NTIS HC A11/MF A01 CSCL 20/11

Shock and vibration damping, and fluid structure interaction are discussed. Shipboard vibration, government policies on reliability and maintainability, finite element analysis, double asymptotic approximation, and sound propagation through liquids in viscoelastic cylinders are among the topics covered. For individual titles, see N83-10217 through N83-10230.

N83-10217# NKF Engineering Associates, Inc., Vienna, Va.
AN APPROACH TO THE LIMITATION AND CONTROL OF SHIPBOARD VIBRATION c39
Edward F. Noonan *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 3-13 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The history of efforts, especially since World War II, to solve

the problems of shipboard vibration is discussed. Standards and specifications are discussed. R.J.F.

N83-10218# Imperial Coll. of Science and Technology, London (England).
STATE-OF-THE-ART ASSESSMENT OF MOBILITY MEASUREMENTS: A SUMMARY OF EUROPEAN RESULTS c39
D. J. Ewins *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 15-35 ref (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Two parallel surveys were conducted to assess the various techniques currently in use in the United Kingdom (UK) and in France for measuring structural mobility properties. A set of test structures were circulated amongst some 18 laboratories in the UK and 16 in France, all actively using measured mobility data, and their submitted results were subjected to detailed scrutiny and comparison. The different excitation methods available were all included and some attention was given to the major applications for mobility data of modal analysis and subsystems coupling. Composite graphs were made of the submitted mobility measurements and consistency checks applied to the results of modal analysis. The survey highlighted difficulties in the transmission of mobility data and also showed the existence of a considerable degree of scatter in the different participants' definitive measurements of specific mobility parameters. R.J.F.

N83-10219# Defense Industrial Supply Center, Philadelphia, Pa.
DEPARTMENT OF DEFENSE POLICY ON RELIABILITY AND MAINTAINABILITY c38
Ben H. Swett *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 37-46 (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/4

The Department of Defense policy on reliability and maintainability is discussed. The role of environmental testing is emphasized. The policy environment under which contractors perform government work is analyzed. R.J.F.

N83-10220# Boeing Co., Seattle, Wash.
NECESSARY AND SUFFICIENT QUALIFICATION FOR SHOCK
Robert Dyrdahl *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 47-50 (For primary document see N83-10216 01-39)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The ability to support preliminary and final design with better analysis and simpler, more realistic, and more straightforward shock specifications is discussed. Load factors are discussed. Recommendations are given regarding the dissemination of information. R.J.F.

N83-10221# Westinghouse Electric Corp., Baltimore, Md.
MYTHS AND SACRED COWS IN SHOCK AND VIBRATION c39
Henry Caruso *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 51-54 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Myths and sacred cows in the field of shock and vibration testing are examined. Orthogonal axis testing; the 2000-H3 upper limit specification for broadband random vibration tests; the 15-g, 11-ms shock test; the 6-g vibration test; and the inclusion in reports of unnecessary data are among the tests and practices that are criticized. R.J.F.

N83-10222# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
ON MODELING VISCOELASTIC BEHAVIOR c39
Lynn Rogers *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 55-69 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The modeling of viscoelastic behavior under sinusoidal, relaxation, creep, constant strain rate, or any other condition is unified. The areas of polymer dynamics, solid mechanics, system dynamics, structural analysis and feedback control systems are drawn upon to construct a unified mathematical treatment which is consistent with observed behavior. A procedure is established to synthesize a stress-strain constitutive differential equation appropriate for more rigorous system dynamics studies. The fractional derivative representation is established as attractive and feasible. Author

N83-10223# Anamet Labs., Inc., San Carlos, Calif. Applied Mechanics Div.
FINITE ELEMENT PREDICTION OF DAMPING IN BEAMS WITH CONSTRAINED VISCOELASTIC LAYERS c39
Conor D. Johnson, David A. Kienholz, and Lynn C. Rogers (AFWAL) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 71-81 refs Sponsored by AFWAL (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Vibration control in structures by means of viscoelastic material in constrained layers has gained wide acceptance, particularly in the aerospace industry. A key to increased use of damping technology is the ability to analyze and define the candidate viscoelastically damped structure accurately and efficiently in a project environment. The validity of the modal strain energy approach is established. The modal strain energy approach uses the modal strain energy distributions, obtained by purely elastic analysis, to predict modal damping (loss) factors. These distributions may also be used by a designer as a tool to choose the best location and material for optimum damping. The approach described in the paper may easily be extended to complex structures. B.W.

N83-10224# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
DYNAMIC BEHAVIOR OF LATHE SPINDLES WITH ELASTIC SUPPORTS INCLUDING DAMPING BY FINITE ELEMENT ANALYSIS c39
A. M. Sharan, T. S. Sankar, and S. Sankar *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 83-96 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The free-vibration behavior of a lathe spindle-workpiece system is investigated using finite element analysis. The investigation is carried out in three parts which are: (1) The classification of the end condition at the running center, (2) The determination of the undamped natural frequencies and the corresponding mode shapes, and (3) The effect of bearing stiffness on the natural frequencies as well as the mode shapes. The theoretically computed natural frequencies are compared with the experimentally obtained frequencies. The end condition at the running center is classified based on the sum of the squares of the residues between the experimental and the theoretically obtained natural frequencies. The undamped mode shapes are explained in terms of the interacting play between the inertia forces, the flexural rigidity of the system, and the spring forces. B.W.

N83-10225# Dayton Univ., Ohio.
FINITE ELEMENT ANALYSIS OF VISCOELASTICALLY DAMPED SANDWICH STRUCTURES c39
M. L. Soni *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 97-109 refs Sponsored by AFML and AFFDL (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Existing finite element modeling techniques are examined for sandwich structures and a new finite element program with improved modeling capabilities is described. The new program is applied to the frequency domain vibration analysis of viscoelastically damped sandwich structures. Damped resonance frequencies and modal loss-factors are obtained of motion. Modal loss-factors are also calculated from the energy weighted loss-factors of components. Damped deflection shapes rather than classical normal

modes are used for this purpose. The application of the developed program is demonstrated in two typical damping analyses. B.W.

N83-10226# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
PNEUMATIC VIBRATION CONTROL USING ACTIVE FORCE GENERATORS **c39**
S. Sankar and R. R. Guntur *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 111-123 refs Sponsored by Natural Sciences and Engineering Research Council of Canada (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Various design aspects of an active vibration control system are considered. Three of the design alternatives currently available are reviewed. It is shown that these three vibration control systems use either explicitly or implicityly a force generator concept. In the proposed system a general expression for the control force is chosen so that this system is representative of not only all the above three systems but also a passive system. Transmissibility characteristics of this system are studied. The results obtained indicate that by proper choice of various feedback gains it is possible to design an active vibration control system that will give the desired transmissibility characteristics. B.W.

N83-10227# Lord Kinematics, Erie, Pa.
THE EXPERIMENTAL PERFORMANCE OF AN ON-OFF ACTIVE DAMPER **c39**
E. J. Krasnicki *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 125-131 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The experimental performance advantages of the "On-Off' active damper used in a single degree of freedom vibration isolation system have been successfully demonstrated. Utilization of the "On-Off' control scheme simplifies the hardware implementation and reduces the cost of the active damper to a point where general industrial use is feasible. In spite of its simple control scheme, the "On-Off' active damper out-performs conventional passive isolation systems with damping ratios sufficient to limit mass motion amplification at resonance. The experimental performance of the 'On-Off' active damper is illustrated and compared to analytical simulations, passive isolation systems, and experimental "Skyhook' active damper performance. B.W.

N83-10228# Pacifica Technology, San Diego, Calif.
AN EVALUATION OF: DOUBLY ASYMPTOTIC APPROXIMATION; STAGGERED SOLUTION SCHEMES; USA-STAGS **c34**
R. S. Dunham, R. J. James, A. S. Kushner, and D. E. Ranta *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 133-172 (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/4

This report presents a comprehensive review and evaluation of the doubly asymptotic approximation and the staggered solution scheme implemented in the USA-STACS computer codes. The equations are derived and discussed in detail. Various solution strategies are examined. A stability analysis of the staggered scheme and a fully implicit integration scheme is done using the Lax-Richtmyer approach. Solutions to several problems are presented and comparisons made to closed form solutions. Detailed conclusions and recommendations are made, and appendices provide a list of errors and recommended improvements in both the USA and STACS codes. Author

N83-10229# Naval Underwater Systems Center, New London, Conn.
MEDIA-STRUCTURE INTERACTION COMPUTATIONS EMPLOYING FREQUENCY DEPENDENT MESH SIZES WITH THE FINITE ELEMENT METHOD **c39**
A. J. Kalinowski and C. W. Nebelung *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 173-193 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The general problem of treating the numerical linear dynamic response of structures imbedded in a medium (fluid or solid) while subject to either radiation conditions or incident traveling wave inputs is considered. The formulation models both the imbedded structure and surrounding medium with finite elements and trats the absorption of waves radiated outward from the structure by means of appropriately sized dampers. Transient solutions are obtained by first computing the steady state transfer function for the response quantity of interest, and later post processing this function with an FFT algorithm in conjunction with the specific input wave form. Segments of the transfer function are computed with the finite element method in the frequency domain by employing a set of frequency dependent mesh size finite element models, carefully designed to operate over a limited frequency band. The entire transfer function is obtained by placing together the individual segments. Author

N83-10230# Naval Research Lab., Washington, D. C.
SOUND PROPAGATION THROUGH LIQUIDS IN VISCOELASTIC CIRCULAR CYLINDERS **c71**
Richard A. Skop *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 217-222 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/1

The propagation of low frequency sound waves through liquids contained in thin walled, viscoelastic circular cylinders is studied. The analysis is based on two suppositions: (1) the sound wave propagates along the cylinder axis and has constant properties over a cross section transverse to this axis; and (2) the dynamic response of the cylinder wall can be calculated adequately from membrane hoop theory. The wall material is described by a general viscoelastic constitutive relation. The results predicted from this analysis are shown to be in good agreement with experiments conducted in viscoelastic cylinders. Author

N83-10231# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION BULLETIN. PART 2: ENVIRONMENTAL TESTING, SHOCK TESTING, SHOCK ANALYSIS
May 1981 244 p refs Proc. of the 51st Symp. on Shock and Vibration, San Diego, Calif., 21-23 Oct. 1980; sponsored by NOSC 3 Vol.
(AD-D432830; Bull-51-Pt-2) Avail: NTIS HC A11/MF A01 CSCL 20/11

Environmental and shock testing are discussed. Shock analysis is also considered. For individual titles, see N83-10232 through N83-10252.

N83-10232# Harris Corp., Melbourne, Fla.
OPTIMIZING PRE- AND POST-PULSES FOR SHAKER SHOCK TESTING **c39**
R. T. Fandrich *In* Shock and Vibration Inform. Center Shock and Vibration Bull., Pt. 2 May 1981 p 1-13 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

A method of selecting pre and post pulses is described. A computer program was written to consider simultaneously four requirements. The computer-shaped pre and post pulses were mathematically integrated to find the velocity and displacement profiles. Parametric variation was performed to optimize the shapes. An example is shown using a MIL-STD 810C, 11 msec, 30G half sine pulse with tolerances of + or - 5% on pre-pulse, + or - 15% on classic pulse and + 20%, -30% on post pulse. Author

N83-10233# Fruehauf Corp., Detroit, Mich. Systems Dept.
SHOCK, VIBRATION AND FATIGUE IN TRANSPORTATION INDUSTRIES **c39**
T. V. Seshadri *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 15-22 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

A durability test technique for tractor-trailers is presented. A

dynamometer is used which inputs periodic bumps to the vehicle. Even though this technique does not simulate the road loading in real time, it provides an overall view of the adequacy of the design for field loads. Theoretical analysis is performed treating the vehicle as a simple dynamical system. A brief review of fatigue design is included. Author

N83-10234# Pacific Missile Test Center, Point Mugu, Calif.
RANDOM IMPACT VIBRATION TESTOR **c39**
W. D. Everett *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 23-30 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The Random Impact Vibration Testor (RIVT) is a new device that efficiently simulates realistic vibration in flight vehicles. The stimulus is repetitive impacts by small projectiles on the surface of the test vehicle. The nature of these impacts is random with respect to the relative location, time interval and intensity between successive impacts. The resultant vehicle vibration resembles that of flight with the characteristics of broad band random noise motion, in many directions, throughout the vehicle structure. Author

N83-10235# Pacific Missile Test Center, Point Mugu, Calif.
PARAMETERS FOR DESIGN OF REVERBERANT ACOUSTIC CHAMBERS FOR TESTING AIR-CARRIED MISSILES **c71**
T. W. Elliott *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 31-39 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/1

Rectangular box-shaped reverberant acoustic chambers were theoretically analyzed, using a normal-mode model, for the purpose of optimal design for simulating captive flight vibration of air-carried missiles. A mathematical derivation relating chamber volume to minimum usable frequency was derived. It was determined that minimum usable frequency varied inversely as the square root of the volume ratios. A computer program was generated to investigate the important parameters for design of these chambers. It was found that, apart from some general rules-of-thumb to avoid in acoustic chamber design, there was no over-riding reason to select one configuration over another. Author

N83-10236# RCA Astro-Electronics Div., Princeton, N. J.
SPACECRAFT MODAL TESTING USING SYSTEMATIC MULTI-SHAKERS SINE-DWELL TESTING TECHNIQUES **c18**
F. H. Chu, C. Voorhees, W. W. Metzger, and R. Wilding *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 41-58 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 22/2

A systematic test procedure is presented for multi-shaker, sine-dwell, modal test of spacecraft. This procedure was applied to the modal testing of a Defense Meteorological Satellite. Good results were obtained. Author

N83-10237# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
DEVELOPMENT OF A MULTIAXIAL FORCE-PULSE GENERATOR **c35**
R. D. Crowson, F. B. Safford (Agbabian Associates), W. J. Schuman, Jr. (Army Ballistic Research Lab.), and R. Freiberg (Army Electronic Research Development Command) *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 59-68 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/2

A laboratory simulation device capable of generating specified force-time histories was developed with a capability of producing rectangular force pulses along two axes in excess of 45 kN. Calibration of the force pulser and initial biaxial tests using a simulated mass in lieu of actual radio equipment were conducted. Such tests clearly demonstrate the feasibility of the system's usefulness in subjecting equipment to force-time histories having both the amplitude and frequency content of those measured in high explosive field tests. Author

N83-10238# Hughes Aircraft Co., Fullerton, Calif.
VIBRATION QUALIFICATION OF EQUIPMENT MOUNTED IN TURBOPROP AIRCRAFT **c05**
L. G. Smith *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 69-72 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 01/3

A test program required the derivation and implementation of environmental criteria for qualification of equipment mounted in turboprop aircraft. The vibration portion of the program is discussed. Both the criteria and the test control methods are unique and are applicable to other programs for qualifying equipment for the turboprop aircraft vibratory environment. Author

N83-10239# Marquardt Corp., Van Nuys, Calif.
QUICK LOOK ASSESSMENT AND COMPARISON OF VIBRATION SPECIFICATIONS
Jeffrey H. Schmidt *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 73-79 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 05/1

A technique is developed by correlating sine, shock or random to the equations obtained via a response spectrum analysis solution for random vibration. By means of this correlation, which is developed for simple then complex structures, it is shown that only one analysis technique need be used to solve all or any one of the designing dynamic environments for a given structure. The proposed technique is simpler and more cost effective than standard solution techniques. Applicable assumptions and limitations are discussed. Author

N83-10240# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
VIBRATION TEST LEVEL CRITERIA FOR AIRCRAFT EQUIPMENT **c05**
Preston S. Hall *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 81-91 refs Previously announced as N81-25070 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 01/3

The Combined Environment Reliability Test (CERT) Evaluation Program utilized different methodologies to formulate the vibration test conditions. The problems of mission profiling the vibration environmental stresses are varied. Each methodology is examined for ease of vibration test condition formulation, utilization, and resultant reliability of the specimens tested. A recommendation is made on vibration test criteria for CERT based upon five years of experience and test results. Author

N83-10241# New Mexico Univ., Albuquerque.
CONSERVATISM IN LEAST FAVORABLE RESPONSE ANALYSIS AND TESTING **c39**
Thomas L. Paez *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 93-109 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

A procedure for computing the probability of shock test conservatism for tests generated using the method of least favorable response is demonstrated. Several numerical examples are presented. Author

N83-10242# Kockums A.B., Malmoe (Sweden).
CALCULATING RESPONSES IN HULL MOUNTED ITEMS OF EQUIPMENT IN SUBMARINES COMPARED WITH MEASUREMENTS CARRIED OUT DURING SHOCK TESTS **c39**
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1928 p 111-119 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

A method for calculating responses of items and outfits mounted in submarines subjected to underwater explosions is described. The shock form is described by means of the Fourier transform of the acceleration-versus-time graph. Dynamic proper-

ties of hull and items are defined by their inertances. The method enables responses of items and outfits to be calculated using the above quantities whilst taking into account the reaction between units and hull structure. The method has been used on results from measurements on a specially designed structure in the 'Steel Mosquito' and the results obtained are presented. Author

N83-10243# Kockums A.B., Malmoe (Sweden).
A COMPUTER-CONTROLLED MEASURING SYSTEM HAVING 128 ANALOG MEASURING CHANNELS AND FACILITIES FOR SIGNAL ANALYSIS **c60**
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 121-128 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 09/2

When explosion testing the submarine hull section 'Steel Mosquito' in 1978 measurements were carried out using a computer-controlled digital measuring system. The system was chiefly designed for explosion test measurements but it can also be used for various types of vibration measurements. At present the system is capable of handling 128 simultaneous signals but it can be extended to 224 channels. After completed measurements the computer can be used for signal analysis of the measurements. Programs were worked out for both signal analysis and modal analysis. The system as used with the explosion tests in 1978 is described. Author

N83-10244# Kockums A.B., Malmoe (Sweden).
A LARGE-SCALE SUBMARINE SHOCK TEST CARRIED OUT AS PART OF THE SWEDISH SHOCK DESIGN DEVELOPMENT PROGRAM **c39**
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 129-136 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The detonation tests carried in 1978 with a test body called the 'Steel Mosquito', a full scale section of a submarine hull are described. A test site was arranged in the Stockholm Archipelago and the test body was moored at a depth of approx. 90 m (300 ft). The purpose of the tests were to investigate various outfits for submarines and to obtain data to be used when designing outfits and equipment for submarines as well as for further development work. Author

N83-10245# Naval Surface Weapons Center, White Oak, Md.
EDESS: AN ELECTROMAGNETICALLY-DRIVEN EXPLOSIVE-SHOCK SIMULATOR **c09**
F. J. Sazama and J. B. Whitt *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 137-147 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/2

A new series of electromagnetically-driven shock generators called EDESS is being evaluated for generating explosive-like shocks. A prototype generator, EDESS-1, was built and its performance was evaluated using 1.0 and 2.0 metric ton payloads. Its shock output and overall performance are close to design expectations as predicted from computer-aided analysis of a simple electromechanical model. Presently, a larger generator, EDESS-2, is being built to extend the payload capability to 5.0 metric tons and a homopolar-driven generator, EDESS-3, is being contemplated for 15.0 metric ton payloads. The electromagnetic shock-generation concept is presented and the progress made in developing these heavy payload shock generators is reviewed. Author

N83-10246# Pennsylvania State Univ., University Park.
ANALYSIS OF ENERGY-ABSORBING SHOCK MOUNTS **c39**
V. H. Neubert *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 149-167 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The behavior of nonlinear energy-absorbing shock mounts or shock snubbers was measured in a standard test machine and in a drop table shock machine. Configurations tested were an aluminum honeycomb and low carbon steel end-loaded tubes, side-loaded tubes and double reverse corrugated metal. Some configurations deform by buckling, with associated positive and negative stiffnesses, while others yield without buckling and exhibit primarily positive stiffness. Analysis was carried out, guided by the experimental results, of energy-absorbing mounts in series and in parallel with linear mounts. The mechanical fuse effect of the energy-absorbing mounts is demonstrated in the series arrangement. In the parallel arrangement the energy-absorbing mount helps reduce deflection. Author

N83-10247# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
ANALYSIS OF THE EFFECTS OF EXPLOSIVE FUEL IGNITION ON AN AIRCRAFT NOISE SUPPRESSOR SYSTEM **c07**
V. R. Miller, E. R. Hotz, and D. L. Brown *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 169-176 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 21/5

The results are presented from a test in which the door acceleration and the pressure environment were measured in an aircraft noise suppressor system, following the delayed ignition of the augmenter fuel of a turbofan engine such that an explosion of this fuel occurred. The system was instrumented with hydrophones, as well as accelerometers and a high temperature microphone. The resulting data were used to define the effects of the augmenter fuel explosion pressure on the noise suppressor system and its components. Author

N83-10248# Sandia Labs., Albuquerque, N. Mex. Explosives Testing Organization.
FEASIBILITY STUDY FOR THE SURFACE IMPULSE LOADING OF STRUCTURES USING MILD DETONATING FUZE **c39**
D. L. Shirey and Floyd H. Mathews *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 177-187 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The possibility of impulsively loading the surface of large structures at relatively low impulse levels by using mild detonation fuze (MDF) was studied. The impulse is obtained when a metal spray driven by detonation of the MDF explosive core strikes an adjacent target resulting in momentum transfer to the target surface. The performance of two common types of MDF was measured. Possible interactions between two parallel, detonating strands of MDF were observed and found to be insignificant. Experimental results are compared. The impulse impaired to flat plate targets was observed using a pulse radiographic technique. Then these results were compared to a computational model which treats the target-spray interaction as an inelastic impact, reasonable agreement was obtained for the normal component of impulse. Author

N83-10249# Sandia Labs., Albuquerque, N. Mex.
A THEORY FOR THE CALCULATION OF EXPLOSIVE DEPOSITION PROFILES FROM THE SPRAY PAINTING OF LIGHT INITIATED EXPLOSIVE **c28**
Floyd H. Mathews *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 189-204 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 21/4

When a weapon structure is exposed to X-rays, the energy deposited in the surface material may result in an impulsive pressure loading on the surface. Laboratory nuclear effects experimentation allows the study of structural response during simulation tests. The processes occurring during spray painting of the explosive layer on the target surface were studied and an empirical theory of spray deposition developed. Important parameters which include explosive concentration in the atomized spray, the deposition profiles for a single pass, with deposition efficiency as a function of spacing, position and incident angle are incorporated into a numerical theory describing the space dependent explosive deposition for a single pass of the spray apparatus. When implemented into a computation of multiple overlapping passes, a reasonably complete prediction is obtained. Several

geometries including flats, cylinders, and cones are described. Methods for improving the spray process are suggested. Consequences of positioning inaccuracies are also studied. Author

N83-10250# Tufts Univ., Medford, Mass. College of Engineering.
THE RESPONSE SPECTRUM METHOD OF SOLUTION FOR DISPLACEMENT EXCITATION c39
F. C. Nelson *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 205-209 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The response spectrum method is formulated in terms of base displacement rather than base acceleration. This allows simpler application of the response spectrum method to spring-mass systems with multiple input motions. The method is extended to systems for which hysteretic damping is incorporated by the use complex stiffnesses. Author

N83-10251# Sandia Labs., Albuquerque, N. Mex.
AN IMPROVED RECURSIVE FORMULA FOR CALCULATING SHOCK RESPONSE SPECTRA c39
David O. Smallwood *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 211-217 refs Previously announced as N81-12367 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

Currently used recursive formulas for calculating the shock response spectra are based on an impulse invariant digital simulation of a single degree of freedom system. This simulation can result in significant errors when the natural frequencies are greater than 1/6 the sample rate. It is shown that a ramp invariant simulation results in a recursive filter with one additional filter weight that can be used with good results over a broad frequency range including natural frequencies which exceed the sample rate. Author

N83-10252# Naval Surface Weapons Center, White Oak, Md.
A FINITE ELEMENT MODEL FOR FAILURE INITIATION IN SHOCK LOADED STRUCTURAL MATERIALS c39
David W. Nicholson *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 219-225 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

The basic finite element equations governing the response of a material described by a recently published constitutive model for dynamically loaded ductile structural materials is described. The main feature of the model is the decomposition of the material response into rate sensitive flow and damage processes. The finite element treatment is based on several assumption regarding the intraelement and interelement distributions of the flow and damage strains. The derived equations comprise a system of ordinary differential equations in time, requiring the specification of nine material parameters. Author

N83-10253# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION BULLETIN. PART 3: ANALYTICAL METHODS, DYNAMIC ANALYSIS, VEHICLE SYSTEMS
May 1981 255 p refs Proc. of the 51st Symp. on Shock and Vibration, San Diego, Calif., 21-23 Oct. 1980; sponsored by NOSC 3 Vol.
(AD-D432842; Bull-51-Pt-3) Avail: NTIS HC A12/MF A01 CSCL 20/11

Progress in work on shock and vibration is reported. Papers in the following categories are presented: analytical methods, torsional vibration analysis of branched systems, Guyan reduction of two degree freedom systems, estimating the error induced by Guyan reduction, critical speeds of multithron crankshafts using spatial line element method; dynamic analysis; and vehicle systems. For individual titles, see N83-10254 through N83-10272.

N83-10254# Polytechnic of Central London (England).
AN IMPROVEMENT TO SHAIKH'S METHOD FOR THE TORSIONAL VIBRATION ANALYSIS OF BRANCHED SYSTEMS c39
B. Dawson and M. Davies (Surrey Univ., England) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 1-10 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

A globally convergent iteration technique for application to residual function value vibration analysis methods was developed as an extension to the method proposed by Shaikh. The technique yields a fully automatic, efficient and foolproof method irrespective of the natural frequency distribution or frequency range of the problems. The iteration formula in the extended method requires the first and second derivatives of the residual determinant as well as the determinant itself and the method of derivation of these derivatives via both a matrix transfer and Holzer procedure is presented. Examples of the application of the extended method to the solution of the torsional natural frequencies of marine geared drive systems are presented which demonstrate the power and efficiency of the extended method. E.A.K.

N83-10255# Westinghouse Research and Development Center, Pittsburgh, Pa.
STUDY OF GUYAN REDUCTION OF TWO DEGREE OF FREEDOM SYSTEMS c64
F. H. Wolff, A. J. Molnar, and J. A. Gribik (Basic Technology, Inc.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 11-18 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

Magnitudes of error involved in reducing a simple two mass (two degrees of freedom d.o.f.) was determined. Two Guyan reduced models were generated by first eliminating the interior node and then by eliminating the exterior node. Errors in matching the two mass model exact first mode frequency and shape with the approximate first mode frequency and shape of both reduced models were calculated for various mass and stiffness ratios. The errors are formulated in terms of any two of several variables. The errors are presented as functions of stiffness ratio for various mass ratios. The definition of stiffness ratio is consistent with the criteria used in the automatic selection technique. E.A.K.

N83-10256# NKF Engineering Associates, Inc., Vienna, Va.
A METHOD FOR ESTIMATING THE ERROR INDUCED BY THE GUYAN REDUCTION c64
Gary L. Fox *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 19-24 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

An accurate and cost effective method to evaluate the actual error induced by the reduction process is presented. The Guyan Reduction refers to a method used to reduce the number of degrees of freedom in a structural model for dynamic analysis. It is shown that this reduction method does provide a reasonably accurate approximation of the dynamic characteristics of the unreduced model. E.A.K.

N83-10257# Tennessee Technological Univ., Cookeville. Dept. of Mechanical Engineering.
CRITICAL SPEEDS OF MULTI-THROW CRANKSHAFTS USING SPATIAL LINE ELEMENT METHOD c37
Cemil Bagci and Donald R. Falconer *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 25-42 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 13/9

A finite element method for the determination of the critical speeds of multithrow crankshafts is presented. The method uses spatial actual finite line element of which each end may experience six degrees of freedom of spatial motion three rotations and three linear displacements. Both regular and irregular elements are used. Equations of free motion are solved for natural frequencies and

the corresponding mode vectors as an eigenvalue problem by matrix iteration, using the reduced dynamics matrix for higher modes. An experimental unbalanced crankshaft having three throws of different sizes, supported by four bearings, connected to a variable speed drive by a flexible coupling, and carrying three external load disks was, tested, and results are compared with those of analytical finite element solutions for different models, including those considering rotary inertias, flexible bearings, and equivalent pure torsional straight shaft models. E.A.K.

N83-10258*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A PARAMETRIC STUDY OF THE IBRAHIM TIME DOMAIN MODAL IDENTIFICATION ALGORITHM c64
Richard S. Pappa and Samir R. Ibrahim (Old Dominion Univ.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 43-72 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

The accuracy of the Ibrahim time Domain (ITD) identification algorithm in extracting structural modal parameters from free response functions was studied using computer simulated data for 65 positions on an isotropic, uniform thickness plate, with mode shapes obtained by NASTRAN analysis. Natural frequencies, were used, to study identification results over ranges of modal parameter values and user selectable algorithm constants. Effects of superimposing various levels of noise onto the functions were investigated. No detrimental effects were observed when the number of computational degrees of freedom allowed in the algorithm was made many times larger than the minimum necessary for adequate identification. The use of a high number of degrees of freedom when analyzing experimental data, for the simultaneous identification of many modes in one computer run are suggested. E.A.K.

N83-10259# Virginia Univ., Charlottesville.
EFFECTIVE DYNAMIC REANALYSIS OF LARGE STRUCTURES
B. P. Wang and F. H. Chu (RCA Astro-Electronics Div., Princeton, N. J.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 73-79 refs (For primary document see N83-10253 01-39)
Avail: NTIS HC A12/MF A01 CSCL 20/11

A dynamic reanalysis method which can be used to estimate the new natural frequencies of the structure after modificating using the modal information of the original structure is described. A nonlinear algebraic equation is derived and by solving this equation using either the Newton Raphson's iteration method or the bisection method will give the new natural frequencies of the structure after modification. This method can be applied to the change of a linear spring, a concentrated mass, an extension member, a beam, and a plate element. A group change of the above mentioned elements can be achieved by solving a set of coupled nonlinear algebraic equations. The accuracy of the method can be improved by including the static deflections of the original structure at the modification locations due to a unit force at these locations to simulate the effect of higher modes of the original structure. A finite element model of a 196 degree of freedom solar array panel system is used to demonstrate the effectiveness and accuracy of the method. E.A.K.

N83-10260# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
EFFECT OF STIFFENER ARRANGEMENT ON THE RANDOM RESPONSE OF A FLAT PANEL c39
R. B. Bhat and T. S. Sankar *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 81-87 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

The effect of stiffener arrangement on the random response of a flat panel was investigated. The panel is stiffened in two orthogonal directions and simply supported on all edges. A stationary random load, acts at the geometric center of the panel. The mean square values of displacement, velocity and acceleration responses at the center of the panel as well as the space averaged values of these responses over the entire area of the panel are obtained. Equivalent viscous damping of the structure is included to account for the structura damping in the material of the panel. Response analysis is carried out by the normal mode approach using finite element techniques and generalized harmonic analysis with damping assumed proportional to the mass and stiffness. It is concluded that it is possible to reduce the response of a stiffened structure by a nonuniform arrangement of the stiffeners. E.A.K.

N83-10261# Dayton Univ., Ohio.
ON NONLINEAR RESPONSE OF MULTIPLE BLADE SYSTEMS
A. Muszynska, D. I. G. Jones (Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio), T. Lagnese (Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio), and L. Whitford (Aeronautical Systems Div., Wright-Patterson AFB, Ohio) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 89-110 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 21/5

Modal and discrete models are examined for predicting the dynamic response of a single jet engine turbine or compressor blade to harmonic excitation by an external force and with restraint provided by a dry friction link to ground. The discrete model is used as a basis to characterize the nonlinear response of a set of several blades connected at their roots to a rigid disk, with dry friction coupling from blade to blade and from blade to ground. The nonlinear differential equations of motion of the system are transformed into a set of nonlinear algebraic equations, which are solved numerically using an iterative method. Several effects including blade mistuning, magnitude and distribution of excitation forces, and phase differences between exciting forces on adjacent blades are illustrated. The effect of dry friction in reducing response amplitudes (damping effect) and the effects of blade mistuning (effects of blade-to-blade coupling) are discussed. E.A.K.

N83-10262# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
VIBRATIONS OF A BEAM UNDER MOVING LOADS BY A FINITE ELEMENT FORMULATION CONSISTENT IN TIME AND SPATIAL COORDINATES c39
Julian J. Wu *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 111-130 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

A finite element formulation, which discretizes the time dimension in the same manner as it does to the special dimension, is presented and applied to the vibration analysis of elastic beams under moving load and to the lateral motions of a gun tube affected by a moving projectile. Bicubic polynomials are used as element shape functions. Stiffness matrices and force vectors integrated both in time and spatial coordinates are described. The versatility of this formulation is demonstrated by numerical results obtained for moving loads with constant and variable velocity beams with sundry support conditions and with differential equations which can be nonself adjoint and with variable coefficients. E.A.K.

N83-10263# Naval Surface Weapons Center, White Oak, Md.
THE BEND-BUCKLING OF A RING-STIFFENED CYLINDRICAL SHELL DUE TO WHIPPING EXCITATIONS c39
Kenneth A. Bannister *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 131-142 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

The problem of interest is the bend-buckling of a ring stiffened cylindrical shell executing a low frequency beam like whipping motion in one plane. This topic is related to the design of practical ring stiffened shell structures subjected to in service bending loads, for example, submarine pressure hulls. The larger objective is a systematic investigation into the dependence of the critical bend-buckling load of the structure on discrete stiffener parameters such as spacing, eccentricity (whether the ring is inside or outside), shape, and area. As a simple initial study, just one ring placed on

a very long uniform shell is considered. Three different models for the problem are briefly reviewed: (1) a Dirac delta formulation which explicitly treats discrete effects; (2) a linear smeared stiffener model in which the ring is smoothed over the shell, thus effectively replacing the original ring/shell by a uniform shell with orthotropic material properties; and (3) a numerical model using the STAGS finite difference computer program. Finally, calculations for typical large shells are presented in order to compare these models.
M.G.

N83-10264# Weidlinger Associates, Menlo Park, Calif.
RESPONSE OF HYDROFOIL STRUT-FOIL SYSTEMS AFTER IMPACT WITH 'DEAD-HEAD' LOGS
Howard S. Levine and Andrew P. Misovec (Weidlinger Associates, Chesapeake, Va.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 143-158 refs Sponsored in part by Naval Ship R and D Center (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

The prediction of the response of strut foil systems after impact with vertical floating logs was studied with the eventual application being the design of composite strut foil systems. The response of steel foils and struts was studied. A simplified technique to determine the log foil interaction force is first developed. This is then applied to a beam model of a generic strut foil system to predict its response. A more sophisticated finite element model is then used to study the early time strut foil log interaction. Basic phenomenology is studied and recommendations for improving the analytical techniques are made.
M.G.

N83-10265# Lockheed Missiles and Space Co., Palo Alto, Calif.
TRANSIENT RESPONSE ANALYSIS OF A LARGE RADAR ANTENNA **c39**
E. Meller, W. A. Loden, and W. Woltornist (Lockheed Electronics Company, Inc., Plainfield, N. J.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 159-167 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

The approach used in determining the transient response of a large ship mounted radar antenna to shock loading resulting from an underwater explosion is described. The dynamic behavior of the antenna configuration, represented by a finite element model of moderate complexity, was determined through direct time integration, using as the forcing function the anticipated motion of the ship platform on which the antenna was mounted. The location in the antenna where the peak stresses occured was determined by inspection of the stress results from this transient response analysis, and a refined finite element model of this region was used to compute more accurate stresses.
M.G.

N83-10266# General Electric Co., Utica, N. Y. Aircraft Equipment Div.
FATIGUE LIFE PREDICTION FOR SIMULTANEOUS STRESS AND STRENGTH VARIANCES UNDER RANDOM VIBRATION **c39**
R. G. Lambert *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 169-176 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

Simple closed form expressions were found to accurately predict the fatigue life of structures subjected to random stresses where the applied stress and the material's strength are simultaneous random variables. These equations are in familiar engineering terms. Analytical predictions and empirical results compare favorably.
M.G.

N83-10267# Argonne National Lab., Ill.
DYNAMIC RESPONSE OF THE PROGRESSIVELY DAMAGING STRUCTURES **c39**
M. G. Srinivasan, G. U. Foneska (Illinois Univ., Chicago), and D. Krajcinovic (Illinois Univ., Chicago) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 177-187 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

The continuous damage theory, originally suggested by Kachanov, is extended to a dynamical problem. The theory is characterized by a kinematic state variable defining the evolution of voids and microcracks in a smoothed or statistical sense. Concentrating on brittle cracking, a simple fracture surface is proposed. The derived equations are subsequently used to solve a one dimensional wave propagation problem using the method of characteristics. Numerical results for several pressure pulses are presented, thus illustrating a method for obtaining estimates of the damage level in a solid as a function of time and space.
Author

N83-10268# Westinghouse Research and Development Center, Pittsburgh, Pa.
LATERAL DYNAMICS OF C4 MISSILE **c15**
F. H. Wolff *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 189-198 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 22/2

A planar model of the C4 missile involving nonlinear force deflection characteristics for the seals and pads was developed. Rigid body equations of motion based on small angle motion were solved to calculate the lateral motion of the missile during launch. After matching the calculated results to a PS-80 test record, variations in seal characteristics, pad characteristics, missile travel time, and initial conditions were studied to determine the sensitivity of the lateral dynamic calculations.
Author

N83-10269# Royal Aircraft Establishment, Farnborough (England).
ANALYSIS OF SUBCRITICAL RESPONSE MEASUREMENTS FROM AIRCRAFT FLUTTER TESTS **c08**
J. C. Copley *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 199-211 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 01/3

A method for the analysis of subcritical response measurements obtained during aircraft flutter tests is described. Suitable forms of input signal, and the derivation of transfer functions using fast Fourier transforms are discussed. The transfer functions are subsequently analyzed to give frequency and damping estimates. Because the effects of atmospheric turbulence degrade the measurements, and hence the estimated parameters, a method for assessing the magnitude of the accuracy of the estimates is developed. Examples of the application of the analysis method to typical response data are given.
M.G.

N83-10270# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Structures and Dynamics Div.
AIRCRAFT RESPONSE TO OPERATIONS ON RAPIDLY REPAIRED BATTLE DAMAGED RUNWAYS AND TAXIWAYS **c05**
Tony G. Gerardi and Lapsley R. Caldwell (Air Force Engineering and Services Center, Tyndall AFB, Fla.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 205-211 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 01/3

A rapid runway repair/aircraft response project is summarized. Current Air Force requirements (AFM 93-2) call for the repair of a 15.24m x 1524m (50 x 5000 ft) minimum operating strip within four hours after the attack. These rapid repairs are made using aluminum AM-2 mats and result in a surface that is rougher than normal and consequently higher than normal loads are induced into the aircraft. The goals of the project are to determine the ground loads capabilities of various aircraft configurations. The planned approach for reaching these goals is through computer simulation, flight testing, and subsequent repair criteria development.
M.G.

N83-10271# Department of Agriculture, Madison, Wis.
A METHOD FOR DETERMINING THE EFFECT OF TRANSPORTATION VIBRATION ON UNITIZED CORRUGATED CONTAINERS **c39**

Thomas J. Urbanik *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 213-224 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

A unitized stack of containers in transit is susceptible to dynamic overloading due to vibrations in the transporting vehicle. The boxes' compressive stiffnesses interact with the content masses to amplify or attenuate the vehicle motions through the height of the column. Modeling a unit load as a multiple degree of freedom vibration system provides a method for evaluating it based on its sensitivity to the frequencies inherent to the transportation environment. The theoretical analysis of the analog that represents a stack of containers and an example that carries the mathematics through a package design problem are presented. To supplement the manual computations which are too time consuming for practical packaging design, a computer program was developed. This program plots the transmissibility in each container over a range in frequencies. An example using the program shows how to interpret the plots and compare the effects of transportation vibration on different unit loads. M.G.

N83-10272# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC ENVIRONMENT ON THE SURFACE OF A LARGE-SCALE POWERED MODEL OF A VECTORED-ENGINE-OVER-THE-WING STOL CONFIGURATION c71
L. L. Shaw and S. Y. Lee *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 225-235 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/1

The results of an acoustic measurement program on a large, powered, highly maneuverable, supersonic STOL fighter model. The model incorporated vectored engine over the wing (VEO) concept including spanwise blowing to provide lift augmentation. This concept exposes portions of the wing and flap structure to high fluctuating pressure levels. Twelve microphones were installed on the surface of the model to define this environment. Six of these were specially developed high temperature transducers capable of withstanding up to 1093 C. Test parameters included engine pressure ratio, wind tunnel dynamic pressure, angle of attack, yaw angle, flap angle, and canard angle. The effect of each of these parameters on the fluctuating pressure environment was defined. The results show that levels as high as 167 kB exist on the upper surface of the flap. Levels resulting from a prediction method in the literature agreed with the measured values for only very limited conditions. M.G.

N83-10273# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
EFFECT OF A DAMPER ON THE WIND-INDUCED OSCILLATIONS OF A TALL MAST
B. Etkin and J. S. Hansen Jan. 1982 40 p refs Sponsored by Natural Sciences and Engineering Council and CKVL Radio
(UTIAS-257; ISSN-0082-5255) Avail: NTIS HC A03/MF A01

The wind induced oscillations in the downwind direction were studied for a tall slender mast that incorporates a unique form of damper. The damper consists of a hinged extension to the main mast, rotation of which is opposed by springs that provide stiffness and by viscous dampers. In that portion of the domain of hinge parameters (stiffness and damping) where conventional (approximate) analysis shows substantial beneficial effects of the damper, a more exact analysis shows that the benefit is not in fact realized. The exact analysis is so termed because it treats the natural modes of the linear vibration problem exactly, in contradistinction to conventional vibration analysis, which approximates complex modes by real modes. The cross vibrations associated with vortex shedding are briefly discussed. S.L.

N83-10274# ABK-A Joint Venture, El Segundo, Calif.
METHODOLOGY FOR MITIGATION OF SEISMIC HAZARDS IN EXISTING UNREINFORCED MASONRY BUILDINGS: DIAPHRAGM TESTING
Dec. 1981 445 p refs 2 Vol.
(Contract NSF-C-PFR78-19200)
(PB82-213679; ABK-TR-03) Avail: NTIS HC A19/MF A01 CSCL 13M

An experimental program conducted on horizontal diaphragms subjected to quasi-static, cyclic, in-plane displacement and dynamic, in-plane earthquake shaking is described. The experimental program is one of several tasks in an overall research program, sponsored by the National Science Foundation, whose objective is to develop a methodology for mitigation of seismic hazards in existing unreinforced masonary buildings. Full-scale component tests on horizontal diaphragms subjected to quasi-static, cyclic, in-plane displacement and dynamic, in-plane earthquake shaking were designed and conducted on 14 diaphragm specimens subjected to 139 test sequences that were comprised of intermingled static and dynamic loadings. The quasi-static tests produced deformations in the diaphragms that ranged from elastic excursions to excursions that produced ductilities of 2, 3, 4, and 6; however, only one diaphragm was driven to the ductility of 6. The dynamic earthquake loadings covered the full range of seismicity in the United States from an Effective Peak Acceleration of 0.1 g to 0.4 g. Author

N83-10275# National Inst. voor Kernfysica en Hoge Energieysica, Amsterdam (Netherlands). Dept. for Special Technologies.
A DESIGN STUDY OF THE VACUUM SYSTEM OF THE DARESBURY X-8 EXPERIMENTAL LINE. PART 1: THE FRONT-END SYSTEM
J. F. J. vandenBrand Mar. 1982 31 p refs
(MTG-17) Avail: NTIS HC A02/MF A01

Pressure profiles for many sets of pumping speed and desorption parameters of a synchroton radiation source beam line vacuum system were calculated. It is shown that for a mass spectrum, consisting mainly of CO and N2, it is possible to operate the machine side of the front-end system in the 10 to the minus 10 th power Torr pressure region. Proof that the two conductance-stage can provide a pressure difference of 1:100 is given.
Author (ESA)

N83-10276# Maryland Univ., College Park. Dept. of Civil Engineering.
COMPUTER ANALYSIS OF STEEL BOX GIRDER BRIDGES Final Report
C. P. Heins and F. H. Sheu Jun. 1981 203 p refs Sponsored by Federal Highway Administration and Maryland State Highway Administration
(PB82-184912; FHWA/RD-81/05) Avail: NTIS HC A11/MF A01 CSCL 13B

An efficient and reliable computer program which can be used to design/analyze straight and curved single or multi-span, composite box girder bridges is presented. The program uses the finite difference method to solve the Vlasov differential equations which describe the load deformation response of a curved box girder and will perform an analysis or design a single prismatic or nonprismatic straight or curved box girder under AASHTO criteria. The box section may be a single unit of the bridge or a member of a multiple box system. The box may be either non-composite or composite construction. The section can have internal transverse diaphragms spaced along the box and top lateral bracing. Output contains influence line ordinates, stresses on top and bottom flanges at locations along the span due to (1) dead load; (2) superimposed dead load and (3) live load. Author

N83-10277# Earthquake Engineering Research Inst., Berkeley, Calif.
SHAKING TABLE TESTS OF A TUBULAR STEEL FRAME MODEL
Yusof Ghanaat and Ray W. Clough Jan. 1982 149 p refs
(Grant NSF PFR-79-08257)
(PB82-220161; UCB/EERC-82/02; NSF/CEE-82011) Avail: NTIS HC A07/MF A01 CSCL 13B

A two dimensional x braced tubular steel offshore platform model was subjected to shaking table motions simulating earth-

quake excitations. The test frame was a 5/48 scale model of a representative platform designed according to wave and earthquake criteria. The dynamic response and failure mechanism to be expected of a typical offshore frame subjected to damaging earthquake motions were measured. A special testing system was designed to provide lateral support to the test model while introducing no constraints in the longitudinal and vertical directions. This arrangement permitted applying a lateral force sufficient to produce major failure in the single test frame, whereas a complete structure including two parallel frames like this could not have been subjected to a failure load. The experimental data provide information on the global inelastic behavior of tubular braced frames, which can be used to verify and extend the ability of existing analytical techniques for prediction the behavior of offshore structures under extreme earthquake conditions. GRA

N83-10278# Earthquake Engineering Research Inst., Berkeley, Calif.
DELIGHT.STRUCT: A COMPUTER-AIDED DESIGN ENVIRONMENT FOR STRUCTURAL ENGINEERING
R. J. Balling, K. S. Pister, and E. Polak Dec. 1981 135 p refs
(Grants NSF PFR-79-08261; NSF ENG-78-10442)
(PB82-218496; UCB/EERC-81/19; NSF/CEE-81048) Avail: NTIS HC A07/MF A01 CSCL 13M

An expandable software system is described for optimization-based, interactive computer-aided design of structures. This system can be used for the design of statically and/or dynamically loaded structures which exhibit linear or nonlinear response. The software is the union of: (1) an interactive base code for the management of the computer-aided design process named DELIGHT, (2) a dynamic nonlinear general-purpose structural analysis package named ANSR, (3) a library of optimization algorithms specialized for the type of mathematical programming problems characteristic of structural design, and (4) specialized software for the design of seismic-resistant planar steel frames. Flexibility has been emphasized in the development of this system so that a wide range of structural problems can be considered. The user describes his problem to the system by supplying a minimal amount of software or by selecting software from expandable libraries. Author (GRA)

N83-10279# Earthquake Engineering Research Inst., Berkeley, Calif.
OPTIMAL DESIGN OF SEISMIC RESISTANT PLANAR STEEL FRAMES
R. J. Balling, V. Ciampi, K. S. Pister, and E. Polak Dec. 1981 127 p refs
(Grants NSF PFR-79-08261; NSF ENG-78-10442)
(PB82-220179; UCB/EERC-81/20; NSF/CEE-81049) Avail: NTIS HC A07/MF A01 CSCL 13M

Seismic-resistant design of planar rectangular braced or unbraced steel frames is discussed. Nonlinear step by step integration is used as the analysis technique within the design process itself. The method directly quantifies the accepted seismic-resistant design philosophy that a structure: (1) resists moderate ground motion without structural damage, and (2) resists severe ground motion without collapse. Actual ground motion accelerograms are selected and scaled to levels representing moderate and severe ground motions. Constraints quantifying structural damage and limited nonstructural damage are constructed for the case of moderate ground motion. Constraints quantifying collapse and limited structural damage are constructed for the case of severe ground motion. In addition there are serviceability constraints on structural behavior under gravity loads only. Possible objective functions range from the minimization of structural volume to the minimization of response quantities such as story drifts or inelastically dissipated energy. Sophisticated optimization algorithms are utilized to solve the resulting mathematical programming problem. GRA

N83-10280# Atkinson-Noland and Associates, Inc., Boulder, Colo.
INVESTIGATION INTO METHODS OF NONDESTRUCTIVE EVALUATION OF MASONRY STRUCTURES
James L. Noland, Richard H. Atkinson, and John C. Baur Feb. 1982 283 p refs
(Grant NSF PFR-79-16572)
(PB82-218074; NSF/CEE-82004) Avail: NTIS HC A13/MF A01 CSCL 13M

Six nondestructive evaluation (NDE) test methods were investigated to assess their potential for strength and condition evaluation of masonry using unmodified commercially available equipment. The methods were: vibration, rebound hammer, penetration, ultrasonic pulse velocity, mechanical pulse velocity, and acoustic-mechanical pulse. These methods were applied to two wythe cantilever wall specimens. Companion small scale specimens, specimens removed from the walls subsequent to the NDE test, and in the wall specimens were tested to destruction to provide compression, shear, and flexural strength data for correlation studies. Results indicated that strength properties of the masonry tested could be estimated generally by some of the NDE methods considered. Investigation of the acoustic-mechanical pulse method indicated that consistent measurements could be obtained and that flaws could be detected. Nondestructive methods offer a means of relative quality assessment and flaw detection, and that some modifications to equipment would enhance efficacy of the methods. S.L.

N83-10281# ABK-A Joint Venture, El Segundo, Calif.
METHODOLOGY FOR MITIGATION OF SEISMIC HAZARDS IN EXISTING UNREINFORCED MASONRY BUILDINGS: WALL TESTING, OUT-OF-PLANE
Aug. 1981 382 p 2 Vol.
(Contract NSF-C-PFR78-19200)
(PB82-213687; ABK-TR-04) Avail: NTIS HC A17/MF A01 CSCL 13M

This report describes an experimental program conducted on unreinforced masonry (URM) walls subjected to dynamic, out-of-plane motions. The experimental program is one of several tasks in an overall research program, sponsored by the National Science Foundation, whose objective is to develop a methodology for mitigation of seismic hazards in existing unreinforced masonry buildings. Full-scale component tests on urm walls subjected to dynamic, out-of-plane motions were designed and conducted on 20 wall specimens subjected to 194 dynamic test sequences covering the full range of seismicity in the United States from a effective Peak Acceleration of 0.1 g to 0.4 g. Author

N83-10282# Atlantic Research Corp., Alexandria, Va.
AUTOMATIC AUDIO SIGNING. VOLUME 1: EXECUTIVE SUMMARY Final Report, Oct. 1980 - Nov. 1981
Washington FHA Nov. 1981 26 p 2 Vol.
(Contract DTFH61-80-C-00177)
(PB82-202953; FHWA/RD-82/012-Vol-1) Avail: NTIS HC A03/MF A01 CSCL 13B

The automatic highway advisory radio (AHAR), facilitates aural roadside to motorist communications without diverting the motorist from the task of driving. The principal tasks performed were: (1) review of prior and ongoing audio signing systems, (2) development of functional specifications, (3) conceptual design, (4) analysis of conceptual design, and (5) system design. Two approaches are recommended, both utilizing low power transmitters providing a highly localized coverage. One would provide real-time analog audio transmission. The other would provide time-compressed or burst transmission of digital data with speech synthesis being performed at the receiver. A detailed design of an engineering model capable of operating in either the real time or burst mode was completed. GRA

N83-10283# Atlantic Research Corp., Alexandria, Va.
AUTOMATIC AUDIO SIGNING. VOLUME 2: REVIEW, ANALYSIS AND DESIGN Final Report, Oct. 1980 - Nov. 1981
Washington FHA Nov. 1981 139 p 2 Vol.
(Contract DTFH61-80-C-00177)
(PB82-202961; FHWA/RD-082/013) Avail: NTIS HC A07/MF A01 CSCL 13B

Automati Audio Signing, also referred to as an 'automatic highway advisory radio system' (AHAR) provides appropriately

equipped motor vehicles one way non commerical communications pertaining to traffic, road and weather conditions, travel advisories, directions, tourist information and other matters of interest to the traveling public. The automatic audio signing project reduces accidents by providing advance warning of hazardous traffic, weather and road conditions; saves the motorists' time and fuel, and reduces motorist irritation by improving traffic control and provides route diversion information when justified by traffic congestion or road blockage; and provides directions, locations of tourist facilities, descriptions of points of interest, and other messages intended to enhance the convenience and enjoyment of the traveling public. Author

N83-10284# National Bureau of Standards, Washington, D.C. Planning Office.
BENEFITS AND COSTS OF IMPROVED MEASUREMENTS: THE CASE OF INTEGRATED CIRCUIT PHOTOMASK LINEWIDTHS Final Report
Carol Chapman Rawie May 1982 83 p refs
(PB82-217183; NBSIR-82-2458) Avail: NTIS HC A05/MF A01 CSCL 13H

Accurate dimensional measurements are vital to quality control in the semiconductor industry. A method is presented for estimating the dollar cost-savings from improving integrated-circuit photomask linewidth measurements. The method is illustrated with a case study of a hypothetical semiconductor device manufacturer who uses a Standard Reference Material (SRM) developed at the National Bureau of Standards for optical microscope calibration. Benefits of investing in improved photomask linewidth measurements include reducing disputes between mask maker and mask customer, reducing waste of good photomasks, and increasing device yields. For the hypothetical manufacturer described in the study, these benefits were much greater than costs of implementing the new measurement procedures. While the model is tailored to photomask linewidth measurements, its concepts can be applied to many other types of measurements. Author (GRA)

N83-10285# Insights West, Inc., Los Angeles, Calif.
AN ASSESSMENT OF VAPOR COMPRESSION HEAT PUMP TECHNOLOGY AND APPLICATIONS FOR INDUSTRIAL PROCESSES Final Report, Nov. 1980 - Feb. 1982
David W. Kearney Apr. 1982 228 p refs Sponsored by Gas Research Inst.
(PB82-227596; GRI-80/0103) Avail: NTIS HC A11/MF A01 CSCL 13A

Vapor compression heat pumps (VCHPs) are an energy conservation technology which can utilize the energy from low temperature waste streams to provide higher temperature energy requirements for industrial processes. The VCHPs are driven by electric motors, steam or gas turbines, or gas engines. The use of heat pumps affects the utilization of natural gas for industrial processes, reducing usage through more efficient utilization or increasing usage through the adoption of gas fired prime movers. The current status and potential of vapor compression heat pump technology and applications for industry and impact of this technology on natural gas utilization is assessed. Industrial applications are identified on a four digit SIC level for each of the generic types of closed and open cycle VCHP systems; temperature boosting, dehumidification, mechanical vapor recompression, and low pressure steam production. It is concluded that vapor compression heat pumps offer a promising energy efficient alternative in many industrial processes. GRA

N83-10286# Kajima Inst. of Construction Technology, Tokyo (Japan).
THE SOLAR ASSISTED AIR-SOURCE HEAT PUMP SYSTEM, PART 1
Toshiyuki Hino Nov. 1980 82 p refs
(PB82-218439; KICT-35) Avail: NTIS HC A05/MF A01 CSCL 13A

A new heat pump heating and air conditioning system was proposed and tested. It features the effective utilization of climatic conditions as its heat sources and sinks, to improve the thermodynamic efficiencies. Reduced electricity consumption, utility load leveling and the least environmental pollutions are expected. The outdoor unit of this heat pump is composed of aluminum panels that are painted black to enhance the radiative heat exchange and fixed almost perpendicularly to improve the natural convective heat transfer with air. The working fluid is halocarbon and commonly used in the heat transfer circuits and the refrigeration cycle. In the heating cycle, the liquid refrigerant evaporates in the passages of the panel. When insolation to the panels is sufficient to meet the heat pump evaporator capacity, the panel temperature will be almost the same as the outdoor air temperature. Thus little convective heat loss to the surrounding air occurs. As the insolation decreases the panel temperature falls several degrees below the outdoor air to absorb heat out of the air until the equilibrium condition is reached. GRA

N83-10287# Earthquake Engineering Research Inst., Berkeley, Calif.
DYNAMIC BEHAVIOR OF GROUND FOR SEISMIC ANALYSIS OF LIFELINE SYSTEMS
Tadanobu Sato and Armen DerKiurgehian Jan. 1982 78 p refs (Grant NSF PFR-78-22265)
(PB82-218926; UCB/EERC-82/01; NSF/CEE-82010) Avail: NTIS HC A05/MF A01 CSCL 13B

A mathematical formula is derived for the general wave transfer function in multilayered media with inhomogeneous and nonlinear properties of soil. It is assumed that the ground consists of horizontally stratified layers overlying a homogeneous half space which is excited by vertically incident, plane shear waves. To formulate the nonlinear harmonic wave solution, the surface layer is regarded as a multilayered system consisting of infinite numbers of sublayers with infinitesimal thicknesses. The mode superposition procedure based on response spectrum provides an expedient tool for dynamic analysis of surficial ground. The characteristic equation for obtaining natural frequencies and free vibration modes is derived by using the proposed wave transfer function. To use the modal analysis for nonlinear systems, a repetition scheme for calculating the model stiffness and damping is proposed which is an adaptation of the equivalent linearization technique. The estimation of intensity of ground shaking is based on a response spectrum for stationary random vibration analysis. The results in conjunction with fatigue theory are used to study the liquefaction problem in soil layers with general topography. Application of the proposed methods in seismic reliability assessment of lifeline systems is discussed. M.G.

N83-10288# Louisiana Advisory Commission on Coastal and Marine Resources, Baton Rouge. Research and Development Section.
AN INTEGRATED PAVEMENT DATA MANAGEMENT AND FEEDBACK SYSTEM (PAMS) Progress Feasibility Report, May 1979 - Aug. 1981
S. C. Shah, Richard W. Kinchen, and Carl D. Rascoe Aug. 1981 89 p refs
(PB82-224429; FHWA/LA-81/152) Avail: NTIS HC A05/MF A01 CSCL 13B

The present practices followed to manage some 16,000 miles to highways are discussed. Necessary improvements or enhancements to upgrade the existing pavement management system were determined. Four major deficiencies in the present system are addressed: (1) absence of common location identifier for linking and merging various data files; (2) pavement distress measurements; (3) axle number and load distribution measurement and projects; and (4) level of maintenance reporting procedures. It is emphasized that development of the pavement management system can begin by upgrading the existing system. GRA

N83-10289# Southwest Research Inst., San Antonio, Tex.
LOW COST PAVEMENT MARKING MATERIALS BASED ON PLASTICIZED SULFUR Final Report, Jun. 1978 - Mar. 1982
John M. Dale Apr. 1982 34 p
(Contract DOT-FR-11-9450)
(PB82-217969; FHWA/RD-82/060; SRI-05-5342) Avail: NTIS

HC A03/MF A01 CSCL 13C

Pavement marking was made more cost effective by reducing the cost of the marking materials. A low cost marking material based on sulfur was developed. Elemental sulfur is a hard, brittle, crystalline material which, on heating, melts to a thin liquid that can be spray applied. If molten elemental sulfur is spray applied to the road as markings, it will on application solidify, crack and adhere poorly to the road. The first ten high speed trucks that ride over the markings will remove them. To make a useful sulfur based pavement marking material it was necessary to chemically modify (plasticize) the sulfur and mix it with fillers and pigments such that it had all of the characteristics desired of a pavement marking material. Yellow and white formulations were developed. For identification they were given the names YS-EIGHT and WS-EIGHT for the yellow and white formulations. GRA

N83-10290# Advanced Mechanical Technology, Inc., Newton, Mass.

HIGH-EFFICIENCY COMMERCIAL WATER HEATER DEVELOPMENT Annual Report, Nov. 1980 - Dec. 1981

Elia P. Demetri, Andrew D. Vasilakis, and Joseph Gerstmann Feb. 1982 107 p refs

(Contract GRI-5080-345-0403)

(PB82-217514; GRI-81/0033) Avail: NTIS HC A06/MF A01 CSCL 13A

An engineering model of a condensing commercial water heater was designed, fabricated and tested. The selected concept consists of a high-efficiency water heater connected by appropriate plumbing to a stratified-temperature storage tank. A relatively simple method of promoting stratification has been devised and tested. Preliminary corrosion resistance tests have been conducted with seven candidate materials for the condensing portions of the system. The overall performance of the system has been measured for parametric variations in operating conditions. Recovery efficiencies in excess of 90% and standby-loss rates as low as 0.7%/hr have been demonstrated with the engineering model. On the basis of the test results, it is projected that the system will achieve service efficiencies of 85-87% under actual usage conditions. GRA

N83-10291# New Hampshire Univ., Durham. Dept. of Civil Engineering.

AN INVESTIGATION OF THE EFFECT OF AGGREGATE ON CONCRETE COMPRESSIBLE STRENGTH Final Report

David L. Gress Mar. 1982 42 p refs Sponsored by New Hampshire Dept. of Public Works and Highways and Federal Highway Administration

(PB82-212457; CE-82-1; FHWA/NH-82/1) Avail: NTIS HC A03/MF A01 CSCL 13C

Findings of an investigation were compiled whose objectives were to determine the significance of variation in the plastic properties of concrete as denoted by construction records; to isolate those variables that also have an affect on the hardened properties of concrete; to determine if rigid control of aggregate gradation could be justified by requiring the aggregate to be separate into several size fractions prior to field batching in order to produce a durable superior concrete; and to evaluate the mircowave oven tehnique of determing the water-cement ratio of plastic concrete. The statistical analysis of ten years of concrete construction data showed that some sources of coarse aggregate had not met their expected strengths and that concretes made of type 2 cements were found to produce compressive strengths about eight percent higher than concrete made of type 1 cements. Findings from laboratory testing implied that improved durability may be obtained by requiring tight control on the coarse aggregate gradation by separating it into three size fractions. The microwave technique appears to be a viable method of determining the water cement ratio of plastic concrete. M.G.

N83-10292# Texas Univ., Austin. Dept. of Civil Engineering.

FRICTION-TYPE BOLTED CONNECTIONS WITH A588 WEATHERING STEEL Final Report, 5 Feb. 1976 - 1 Jun. 1981

J. A. Yura, K. H. Frank, and L. Cayes Dec. 1981 32 p refs

(FH-11-8900)

(PB82-203183; FHWA/RD-81-147) Avail: NTIS HC A03/MF A01 CSCL 13C

One hundred twenty-six slip tests were conducted on friction type bolted connections fabricated from A588 weathering steel. The tests were conducted mainly on specimens with mill scale or blasted surfaces which were exposed to the atmosphere for periods up to one year. The test results indicate that A588 mill scale surface has a 33 percent lower slip resisance than those reported for other steels. Suggested revisions to the bridge specifications based on this behavior are presented. GRA

N83-10293# Virginia Highway and Transportation Research Council, Charlottesville.

EFFECTIVE FIELD USE OF HIGH RANGE WATER REDUCED CONCRETE Final Report, Feb. 1977 - Nov. 1981

Michael M. Sprinkel Nov. 1981 96 p refs Sponsored by Virginia Dept. of Highways and Transportation Prepared in cooperation with Federal Highway Administration

(PB82-201609; VETRC-82-R24; FHWA/VA-82/24) Avail: NTIS HC A05/MF A01 CSCL 13C

The experience of the Virginia Department of Highways and Transportation with the use of high range water reduced (HRWR) concrete is described as well as the installation of the HRWR concrete in two pavements and four bridge decks. The results of evaluative tests are included along with recommendations concerning the further use of HRWR concrete. On the average the HRWR concrete placed in the field with conventional equipment was properly consolidated and controlled. However, because of the unanticipated variability of the concrete, portions of the concrete exhibited inadequate consolidation, segregated mixture components, improperly entrained air, shrinkage cracks, and poor finishes. Specimens subjected to cycles of freezing and thawing showed low durability factors that were attributed to an unsatisfactory air void system. Subsequent laboratory work revealed that HRWR admixtures satisfied the requirements of ASTM C494. A.R.H.

N83-10294# National Bureau of Standards, Washington, D.C.

ECONOMICS AND ENERGY CONSERVATION IN THE DESIGN OF NEW SINGLE-FAMILY HOUSING Final Report

Stephen R. Petersen Aug. 1981 161 p refs Sponsored by DOE

(PB82-203639; NBSIR-81-2380) Avail: NTIS HC A08/MF A01 CSCL 13M

The extent to which certain energy conservation modifications to the envelope design of a new, single family house are economically justified for a wide range of climates and projected energy costs were investigated factors that give rise to space heating and cooling loads in buildings are provided thermal interdependencies within and among envelope components that can greatly affect heating and cooling loads are examined. Economic criteria for determining a minimum life cycle cost building envelope design are formulated and a priority ranking method is developed to assist in the calculation of these designs. An expanded version of the NBS load determination program is used to calculated the annual heating and cooling requirements and maximum heating and cooling loads for a 1200 square foot, wood frame house with a wide range of thermal improvements in 14 geographic locations. It is demonstrated that the optimal envelope design configuration varies over a wide rang depending on climate, energy costs, and modification costs. GRA

N83-10295# Transportation Research Board, Washington, D.C.

PAVEMENT ROUGHNESS AND SKID PROPERTIES

1981 94 p refs

(PB82-212309; TRB/TRR-836) Avail: NTIS HC A05/MF A01 CSCL 13B

Road roughness and roadway safety as it relates to both surface and air transportation are discussed. The role of road roughness in vehicle ride, the measurement of roughness, the evaluation of riding confort, and the effect of grooving pavements are discussed. The effects of differential pavement friction on the response of cars in skidding maneuvers is discussed. GRA

N83-10296# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
MARKET DIFFUSION AND THE EFFECT OF DEMONSTRATIONS: A STUDY OF DENVER METRO PASSIVE SOLAR HOME PROGRAM Final Report
Gary L. Lilien Oct. 1981 43 p refs Sponsored by DOE
(PB82-180332; MIT-EL-81-040) Avail: NTIS HC A03/MF A01 CSCL 13B

The reactions to and effects of the Denver metro passive solar home demonstration program, conducted in the spring of 1981 are reported. The program provides impetus to builders for incorporating passive solar designs in spec built homes and demonstrates those designs to prospective buyers to increase buyer receptivity. A pre-post exposure analysis of the effect of the program is reported and four separate groups of prospective new home buyers are studied. The first group heard publicity about and voluntarily visited a demonstration home. The second group saw the home, but was recruited to come to the side. The third group, also in Denver, did not see the site, but answered the same set of questions after receiving a description of and pictures of passive solar homes. The fourth group was a control group, similar to the third, but located in Kansas City. GRA

N83-10297# National Bureau of Standards, Washington, D.C. Center for Building Technology.
ANALYSIS OF THERMAL COMFORT IN A PASSIVE SOLAR HEATED RESIDENCE
S. Liu Nov. 1981 36 p refs Sponsored by DOE
(PB82-180142; NBSIR-81-2393) Avail: NTIS HC A03/MF A01 CSCL 13A

The thermal comfort conditions in a passive solar heated residence of the popular Trombe Wall configuration were investigated. The indoor thermal environment of an actual passive solar residence, using the typical meteorological year (TMY) weather data tape as input as three locations of different climatic conditions was simulated. The relevant thermal comfort parameters such as the space air temperature, mean radiant temperatures, operative temperatures, radiant temperature asymmetry, and temperature drifts of the occupied zone, were computed for a prime heating month, a transition month and a prime cooling month of a typical weather year at the three locations. It is found that for the specific passive solar residence analyzed, the upper boundary of the comfort envelope can be exceeded (overheating) during a typical clear day in the transition month of April unless a change of clothing to summer wear is made during the daytime high solar radiation house. The upper boundary will be exceeded during a typical clear day in the prime cooling month of August for a person in typical summer clothing at all three locations unless the average air movement in the occupied zone is increased above the level of natural circulation, or the thermostat setting is reduced to a lower level, or both. GRA

N83-10298# Centre Technique des Industries Mecaniques, St. Etienne (France).
FORMING TECHNIQUES AND PROCEDURES Final Report
F. Ronde-Oustau Sep. 1980 48 p Transl. into ENGLISH of "Nouveaux Procedes de Mise en Forme" (France), Mar. 1982 Translation was announced as N82-10278
(PB82-289002) Avail: NTIS HC A03/MF A01 CSCL 13H

Several forming techniques are discussed including: (1) cooling stamping and swaging tools by the 'Caloduc' methods; (2) non-burr stamping (stamping in a closed die); (3) continuous casting; (4) orbital forging; and (5) plastic deformation and spheroidal graphite iron. In addition, the subject of superplasticity is discussed in some detail, and brief consideration is given to precision forging, forging die castings, sintered forging, squeeze casting, ausforming, magnetoforming, and ultrasonic forming. M.G.

N83-10299# Chalmers Univ. of Technology, Goteborg (Sweden).
RAIN FALL DATA FOR THE DESIGN OF SEWER PIPE SYSTEMS
Viktor Arnell 1982 225 p refs
(PB82-187212; ISSN-0348-1050) Avail: NTIS HC A10/MF A01 CSCL 13B

A comparison of designs of sewer pipes for different types of rainfall data is presented. Local coefficients were evaluated from an 18-year historical rainfall record for the following design storms: The Average-Intensity-Duration Design Storm, The Chicago Design Storm, The Sifalda Design Storm, The Illinois State Water Survey Design Storm, and The Flood Studies Report Design Storm. Historical rainfalls as well as the above design storms were used for the calculations of peak-flow values. Author

N83-10300# Connecticut Univ., Storrs.
DEVELOPMENT AND EXPERIMENTAL EVALUATION OF A STEEL TUBE VEHICLE IMPACT ATTENUATION SYSTEM Final Report
John F. Carney, III Sep. 1981 88 p refs Sponsored by the Connecticut Dept. of Transportation and by DOT
(PB82-182684; FHWA/CT/RD-722-2-81/12) Avail: NTIS HC A05/MF A01 CSCL 13B

The vehicle crash attenuator scale model experimental program is discussed. A design procedure based on these experiments was developed and employed to design two full scale steel tube impact attenuation systems. These systems were subjected to a full scale crash testing program involving vehicles of various weights impacting the units at different locations while traveling at 60 mph. The performance of these impact attenuation devices with respect to structural adequacy, impact severity, and vehicle trajectory are evaluated. Author (GRA)

N83-10301# Applied Technology Council, Berkeley, Calif.
SEISMIC DESIGN GUIDELINES FOR HIGHWAY BRIDGES Final Report
Ronald L. Mayes and Roland L. Sharpe Oct. 1981 216 p refs (Contract FH-11-9295)
(PB82-181611; FHWA/RD-81/081) Avail: NTIS HC A10/MF A01 CSCL 13B

Guidelines for the seismic design of highway bridges are given. The guidelines are the recommendations of a team of nationally recognized experts which included consulting engineers, academicians, State highway, and Federal agency representatives from throughout the United States. The guidelines are comprehensive in nature and they embody several new concepts which are significant departures from existing design provisions. An extensive commentary documenting the basis for the guidelines and an example demonstrating their use are included. A draft of the guidelines was used to seismically redesign twenty-one bridges. A summary of the redesigns is included. GRA

N83-10302# Massachusetts Inst. of Tech., Cambridge.
ALTERNATIVE ELECTRIC GENERATION IMPACT SIMULATOR Final Summary Report
James Gruhl, David Coate, and Edmund Schweppe Aug. 1981 124 p refs Sponsored by Northeast Utilities Service Co.
(PB82-180324; MIT-EL-81-044) Avail: NTIS HC A06/MF A01 CSCL 13B

The potential for, and significance of, uncertainty in the energy technology assessment process was explored. Technology assessments primarily from a methodological viewpoint. A general ideal methodology is developed and the potentials for incorporating uncertainties are described. The implementation of an ideal assessment methodology resulted in the coding of a simulator that should be viewed as a framework for assembling and manipulating information about the economics, emissions, ambient concentrations, and potential health impacts of different types and configurations of electric power generating facilities. The framework is probabilistic, and thus results in several measures of the range of various consequences, in other words a graphic display of the quality of the various predictions. The simulator is structured so that it is easy to improve the sophistication of certain manipulations, or to replace generic data, or update or add new data. A.R.H.

N83-10303# PAWA, Inc., Dallas, Tex.
EXPERIENCES IN TRANSPORTATION SYSTEM MANAGEMENT Final Report

John J. Roark Nov. 1981 99 p refs Its National Cooperative Highway Research Program Number 81 Sponsored in part by Federal Highway Administration, Washington, D.C. and American Association of State Highway and Transportation Officials, Washington, D.C.
(Contract HR-20-5)
(PB82-181322; TRB/NCHRP/SYN-81) Avail: NTIS HC A05/MF A01 CSCL 13B

The application of transportation system management (TSM) actions in different operating environments is described. Both successful and unsuccessful TSM experiences are analyzed. There are more than 150 actions that can be included in a TSM program. Experiences with these actions are summarized and guidelines within the context of nine operating environments, ranging from a freeway corridor to a local neighborhood are provided. Recommendations for future research needs are included. Author (GRA)

N83-10304# National Bureau of Standards, Washington, D.C. Center for Fire Research.
CALCULATIONS OF THE HEAT RELEASE RATE BY OXYGEN CONSUMPTION FOR VARIOUS APPLICATIONS
W. J. Parker Mar. 1982 44 p refs
(PB82-192956; NBSIR-81-2427-1) Avail: NTIS HC A03/MF A01 CSCL 13L

Heat release equations are developed in a general way and it is shown how they can be adapted to various applications such as: closed systems versus open systems; trapping carbon dioxide before it reaches the oxygen analyzer, measuring it, or assuming that it is equal to the reduction in oxygen concentration; ignoring carbon monoxide or measuring it; accounting for the density of the exhaust gases or assuming that it is the same as for air; using a high temperature oxygen cell which measures the oxygen concentration in the exhaust duct directly or a paramagnetic analyzer for which corrections must be made for water vapor trapping; taking into account or ignoring the ambient concentration of water vapor and carbon dioxide; and, improving the accuracy for open systems by monitoring the water vapor in the exhaust duct. The equations developed should be useful to anyone setting up a new system and will provide a means of calculating the errors which might be expected when simplified procedures are used. GRA

N83-10305# Engineers Testing Labs., Inc., Phoenix, Ariz.
SULFATE RESISTANCE OF MORTARS USING FLY ASH AS A PARTIAL REPLACEMENT FOR PORTLAND CEMENT Final Report
J. C. Rosner and J. G. Chehovits Feb. 1982 137 p refs Sponsored by Federal Highway Administration and Wyoming State Highway Dept.
(PB82-208810; Rept-2390J022; FHWA/WY-82/3161) Avail: NTIS HC A07/MF A01 CSCL 13C

The sulfate resistance of motors that use fly ash as a partial cement replacement with control mortars that do not contain fly ash were compared. Fly ash from four different sources and at three different replacements, 10%, 15% and 20%, by weight, were evaluated. Three of the fly ashes satisfied ASTM C618, Class F, specifications and one fly ash met all requirements except for the available alkalies. A single portland cement source, meeting the ASTM specifications for Type II, was used. One by one by eleven inch mortar bars were subjected to a mixed (sodium and magnesium) sulfate solution environment. Physical measurement of mortar bars include length change, weight change, porosity and relative dynamic modulus. Improvements in sulfate resistance over that provided by a Type II cement may be obtained through the use of certain fly ashes in portland cement concrete. Three of the ashes studied significantly improved sulfate resitance as indicated by percent expansion. GRA

N83-10306# Matrecon, Inc., Oakland, Calif.
MORE ECONOMICAL BUT EQUALLY EFFECTIVE INTERNALLY SEALED CONCRETE Final Report
R. M. White, M. A. Taylor, and H. E. Haxo, Jr. Dec. 1981 149 p refs
(Contract DOT-FH-11-9403)
(PB82-208075; FHWA-RD-82/083) Avail: NTIS HC A07/MF A01 CSCL 13C

Wax beads of several lower melting, lower cost wax blends can seal concrete as effectively as the paraffin-montan wax beads currently used in internally sealed concrete bridge decks, without affecting other important properties of the concrete. Savings of 5% to 25% in raw material costs can be expected to lower the cost of wax beads by approximately 5% to 20%. Since the minimum temperature required for melting the wax beads is about 25 F (14 C) lower than for the current beads, the cost of heating a bridge deck to achieve effective sealing should be reduced by approximately 15%. Beads of two formulations: 10% montan wax, 15% firbark wax, 75% paraffin 140/142 (FMP), and 5% stearic acid, 20% hydrogenated tallow, 75% paraffin 150/152 (STP), were produced in pilot plant quantities and were evaluated on two field tests. Damage to the beads during extended mixing of the concrete was suspected to be one of the causes of low strength and poor resistance to scaling of the test slabs in the first test. Some blocking of the lower melting beads at temperatures between 100 and 110 F (38 and 43 C) occurred during production in hot weather or storage for long times in warm locations. Coating the beads with 10% cement restored them to a free-flowing condition. GRA

N83-10307# National Building Research Inst., Pretoria (South Africa). Inorganic Materials Div.
LOW MAINTENANCE BUILDING WITH INORGANIC MATERIALS
J. E. Kruger 1981 9 p refs
(PB82-206343; NBRI-BOU-854) Avail: NTIS HC A02/MF A01 CSCL 13C

Some properties of inorganic materials which can have a significant influence on their performance and which, due to lack of knowledge or for other reasons, are often ignored are discussed. Basic considerations concerning the use of inorganic materials are outlined. Aspects of these inorganic materials determine the degree of maintenance required and often have a much larger influence on the performance of a building than the mere choice of material. GRA

32 COMMUNICATIONS

Includes land and global communications; communications theory; and optical communications.

For related information see also *04 Aircraft Communications and Navigation* and *17 Spacecraft Communications, Command and Tracking.*

N83-10308# British Broadcasting Corp., Kingswood (England). Engineering Div.
HIGH QUALITY DECODING FOR PAL INPUTS TO DIGITAL YUV STUDIOS
C. K. P. Clarke Jul. 1982 9 p refs
(BBC-RD-1982/12) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

With the planned conversion of studio equipment to digital component signal operation, there is need for high quality phase alteration line (PAL) decoders at the interface with current equipment. The addition of movement detection circuits to picture delay comb filters was expected to produce a decoder with good overall performance. Thus far, movement detection methods are unable to produce a suitable mode switching signal for the adaptive control. If this problem proves fundamental, an alternative nonadaptive approach is needed in which the bandwidth of the luminance and chrominance output signals may have to be noticeably reduced. In this case, the positioning of decoders to minimize the number of decode and recode operations can be an important factor in maintaining reasonable quality from PAL signals during the changeover period to YUV. Author

N83-10309# British Broadcasting Corp., Kingswood (England). Engineering Div.
THE DESIGN OF A NEW WIDEBAND MODULAR SOUND ABSORBER
R. Walker and P. H. C. Legate Jun. 1982 18 p refs
(BBC-RD-1982/8) Avail: BBC, Kingswood Warren, Tadworth, Surrey, England

A modular system of acoustic treatment for use in a wide range of types of studios, control rooms, and other areas is discussed. Although the system at present in use is generally satisfactory, several defects are identified. The design of a new module intended to absorb sound over the entire audio frequency range and to overcome these defects is discussed and the results of some measurements are presented. The final design for the new module is described and its performance is compared with that of the combination of the earlier modules most commonly used in small and medium sized rooms. The proposed module is far from ideal and will probably prove to be more expensive to manufacture. Author

N83-10310 British Broadcasting Corp., Kingswood (England). Engineering Div.
BALANCING ARTIFICIAL REVERBERATION FOR TELEVISION STEREOPHONY
P. S. Gaskell Jul. 1982 9 p
(BBC-RD-1982/9) Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

Artificial reverberation, from a reverberation plate or an electronic device, is often added when mixing the sound for television programmes. In recent post production sessions for BBC experimental television programs with stereophony, an undesirable imbalance between the artificial reverberation and the source sound has been observed, making it difficult to achieve a uniform distribution of reverberation across the stereo stage. The effect occurs most often in drama and, to a lesser extent, in opera. The reasons for this are analyzed and approaches for dealing with it are suggested. Author

N83-10311# British Broadcasting Corp., Kingswood (England). Engineering Div.
RANK ORDER DIFFERENCE ANALYSIS APPLIED TO TESTS OF THE TELEVISION CONSISTENCY INDEX
E. W. Taylor Jul. 1982 26 p refs
(BBC-RD-1982/10) Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

Statistical theory concerned with rank order analysis is outlined and the television consistency index method of assessing lamps for color television scene lighting is described. An assessment, in terms of rank order, is made which shows that to a large extent, the consistency index is representative of lamp performance, while being independent of particular color television camera analysis characteristics. A theoretical model of a color television transmission system was used. A.R.H.

N83-10312# British Broadcasting Corp., Kingswood (England). Engineering Div.
A FIBRE-OPTIC LINK FOR TELEVISION OUTSIDE BROADCASTS
P. Shelswell Jun. 1982 14 p
(BBC-RD-1982/11) Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

A fiber optic link which transmits video signals on an fm carrier is described. It uses a conventional 70 MHz intermediate frequency, and can therefore be used in conjunction with shf links or separately as desired. The link uses a lightemitting diode as a source and is capable of transmission over distances of about one kilometer. After that attenuation and dispersion increase the amount of noise. An outline of the system and its expected performance are given. Then the actual performance of the link as measured in the laboratory and in field trials is described. J.D.

N83-10313# British Broadcasting Corp., Kingswood (England). Engineering Div.
RADIO-FREQUENCY IGNITION HAZARDS: THE CHOICE OF REFERENCE AERIAL FOR AVAILABLE-POWER CALCULATIONS
P. Knight Sep. 1982 11 p refs
(BBC-RD-1982/16; RA-208) Copyright. Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

Structures in petrochemical plants can act as receiving aerials and extract power from radio waves; if a spark is generated there is a risk that flammable vapours might be ignited. The power available from a structure is closely related to that available from a small loss-free reference aerial in the same location, the ratio of the two powers being known as the efficiency. The powers available from various types of aerials and structures are considered, taking account of the effect of the ground. It is concluded that the most convenient reference is a small aerial in free space, with the efficiency of the structure defined so as to include, among other things, the effect of proximity to the ground. Author

N83-10314# British Broadcasting Corp., Kingswood (England). Engineering Div.
L.F./M.F. RADIO DATA: COMPATIBILITY TESTS
A. G. Lyner Aug. 1982 21 p
(BBC-RD-1982/15; EL-163) Copyright. Avail: BBC, Kingswood Warren, Tadworth, Surrey, Engl.

Investigations carried out to establish suitable parameters for an angle-modulation system for adding data signals to an m.f. or l.f. sound broadcast programme are described. Mechanisms causing crosstalk between data and sound channels in such a system are discussed and the likely degree of crosstalk is assessed. Suitable parameters for a data-signalling system are suggested, based upon results from a series of subjective tests made in the laboratory and over air. Author

N83-10315 Northwestern Univ., Evanston, Ill.
RAY METHODS FOR INVERSE PROBLEMS OF ELASTIC WAVE SCATTERING Ph.D. Thesis
Andrew Norman Norris 1981 206 p
Avail: Univ. Microfilms Order No. DA8204948

Inverse scattering methods based on time domain data are proposed, which are particularly suitable for the mapping of crack like flaws in homogeneous media. The methods require input data that can be either directly measured or computed from measured data. The first method maps a point on the scatterer by a process of triangulation with the source and receiver as given vertices of the triangle. The inverse mapping is global in the sense that no a priori knowledge about the location of the scatterer is necessary. The second method maps the scatterer by determining the envelope of a set of planes. For the case of cracks, the envelope maps an approximation to the crack edge. Also it is based on approximations valid only in the neighborhood of the edge, thus it is a local inverse mapping. The starting point for the triangulation method is Fermat's Principle, which states that first arriving signals describe geodesic curves. Dissert. Abstr.

N83-10316 City Univ. of New York, N. Y.
SYNCHRONIZATION, BANDWIDTH OCCUPANCY AND EFFECTS OF TRANSMISSION ERRORS IN DIGITAL COMMUNICATION SYSTEM Ph.D. Thesis
Martin Braff 1981 167 p
Avail: Univ. Microfilms Order No. DA8203270

The increased use of digital transmission in telephone networks motivates attempts to perform the switching function in digital form also. Such a digital network, however, requires carefully synchronized clocks to perform correctly. A new technique is presented for synchronizing such clocks called Peak Synchronization. This technique will be studied and compared to others that have been previously investigated. When a digital signal is encoded for channel error protection, the resulting encoded signal may have statistics differing greatly from the original signal. The correlation of the encoded signal is especially important as it allows for the determination of the signal's power spectrum. The correlation also provides information about the density of transitions, which is important in bit synchronizer design. Delta Modulators have been

extensively studied to determine their quantizing and slope overload distortion. Dissert. Abstr.

N83-10317 City Univ. of New York, N. Y.
A MODIFIED ADAPTIVE DELTA MODULATOR FOR VIDEO DATA COMPRESSION Ph.D. Thesis
Joseph Barba 1981 219 p
Avail: Univ. Microfilms Order No. DA8203266

The results of a study in data compression of adaptive delta modulated (ADM) video signals are presented. The Song mode ADM is first investigated and shown not to produce enough redundancy to warrant entropy encoding. A modified adaptive delta modulator algorithm is presented that produces sufficient redundancy to yield a 40 to 50% data compression by using a simple 4-bit block code. Other techniques such as field interpolation and direct substitution are shown to further increase the possible data compression without noticeable degradation in the two input images used in this investigation. A frame freeze unit is presented that can be used in conjunction with the modified modulator to capture a frame a video for transmission over a computer network. The effects of channel error in the transmission of packet video over a computer network are considered. A leaky integrator is used to reduce the effects of channel errors in the data bits. It is shown that the effects of channel errors on the block code header bits can be reduced by field interpolation those packet that can be determined to contain error on header bits. Dissert. Abstr.

N83-10318 Princeton Univ., N. J.
LOW NOISE COMPUTATIONALLY EFFICIENT METHODS IN DIGITAL SIGNAL PROCESSING Ph.D. Thesis
Rashid Ansarai 1981 109 p
Avail: Univ. Microfilms Order No. DA8203226

Digital filtering schemes that offer low complexity coupled with low quantization noise are investigated. The schemes employ allpass sections as building blocks to exploit the computational advantage of recursive filters while avoiding the large quantization errors associated with recursive filters. A new multiband filtering scheme in the form of a parallel connection of two unit amplitude allpass sections is proposed. The scheme requires about two-thirds the number of multiplications needed in a cascade realization of elliptic filters that meet the same specification. A numerical procedure for designing filters with approximately minimax amplitude response is presented. The analytic optimum for odd order lowpass and highpass filters of this new class is shown to be the elliptic filter itself. One form of first order and three forms of second order allpass transfer functions are considered. Realizations of these transfer functions are presented and shown to ensure low quantization noise, regardless of pole locations. Dissert. Abstr.

N83-10319 Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
SELF CONSISTENT LOOP ANTENNA THEORY
Satish Puri Feb. 1982 45 p refs Sponsored by Euratom
(IPP-4/205) Copyright. Avail: Issuing Activity

An analytic theory of idealized finite loop antennas with an arbitrary current distribution was formulated. Computational steps required for the determination of the antenna current, consistent with the perfectly conducting antenna surface, are outlined. The isolated antenna in free space, and the effects due to the Faraday shield, the wall and the plasma are considered. All the necessary antenna parameters can be obtained if the plasma surface impedance is known. The concept of the cross fin antenna, which combines wave launching and Faraday shielding in a single composite structure, is introduced. Author (ESA)

N83-10320*# Ohio State Univ., Columbus. ElectroScience Lab.
THE COMSTAR D/3 GAIN DEGRADATION EXPERIMENT
T. C. Lee and D. B. Hodge Jun. 1981 39 p refs
(Contract NASw-3393)
(NASA-CR-169442; NAS 1.26:169442; ESL-712759-5) Avail: NTIS HC A03/MF A01 CSCL 20N

The results of gain degradation measurements using the Comstar D/3 19.04 GHz beacon are reported. This experiment utilized 0.6 and 5 m aperture antennas aligned along the same propagation path to examine propagation effects which are related to the antenna aperture size. Sample data for clear air, scintillation in clear air, and precipitation fading are presented. Distributions of the received signal levels and variances for both antennas are also presented. M.G.

N83-10321*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
END-TO-END IMAGING INFORMATION RATE ADVANTAGES OF VARIOUS ALTERNATIVE COMMUNICATION SYSTEMS
Robert F. Rice 1 Sep. 1982 46 p refs
(Contract NAS7-100)
(NASA-CR-169428; JPL-PUB-82-61; NAS 1.26:169428) Avail: NTIS HC A03/MF A01 CSCL 17B

The efficiency of various deep space communication systems which are required to transmit both imaging and a typically error sensitive class of data called general science and engineering (gse) are compared. The approach jointly treats the imaging and gse transmission problems, allowing comparisons of systems which include various channel coding and data compression alternatives. Actual system comparisons include an advanced imaging communication system (AICS) which exhibits the rather significant advantages of sophisticated data compression coupled with powerful yet practical channel coding. For example, under certain conditions the improved AICS efficiency could provide as much as two orders of magnitude increase in imaging information rate compared to a single channel uncoded, uncompressed system while maintaining the same gse data rate in both systems. Additional details describing AICS compression and coding concepts as well as efforts to apply them are provided in support of the system analysis. S.L.

N83-10322*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MULTI-STAGE DEPRESSED COLLECTORS (MDC) FOR EFFICIENCY IMPROVEMENTS OF UHF BROADCAST KLYSTRONS
H. G. Kosmahl 1982 9 p Presented at the 32d Natl. Broadcasting Symp., Washington, D.C., 16-17 Sep. 1982; sponsored by IEEE
(NASA-TM-82970; E-1391; NAS 1.15:82970) Avail: NTIS HC A02/MF A01 CSCL 17B

The consumed primary power is reduced and the efficiency of traveling wave tubes is raised through the use of depressed collectors which passively convert potential energy into electric energy. Efficiency was kept with constant within a 3 dB range while the output power varied by 10 dB. Aspects to be considered in transferring this technology to UHF klystrons are the electron energy spectrum of the klystron and the magitude of the injection angle required. A.R.H.

N83-10323*# Ohio State Univ., Columbus. ElectroScience Lab.
ANALYSIS OF AIRBORNE ANTENNA PATTERNS Semiannual Technical Report
Roberto G. Rojas, E. H. Newman, and W. D. Burnside Sep. 1982 25 p refs
(Contract NsG-1498)
(NASA-CR-169448; NAS 1.26:169448) Avail: NTIS HC A02/MF A01 CSCL 17I

The status of various efforts in support of the development of computer codes to analyze the radiation patterns of general aviation aircraft and simulate private aircraft is reported. Because of the significant amount of energy scattered by the windshield of private aircraft, a method is being developed to treat high frequency scattering by thin dielectric layers. To treat such aircraft at lower frequencies, i.e., where the aircraft surface area is less than 10 square wavelengths, a moment method code is being modified. The problem of plane (or surface) wave diffraction by the dielectric half plane is constructed and discussed. A.R.H.

N83-10324*# Ohio State Univ., Columbus. ElectroScience Lab.
A GENERALIZED METHOD FOR DETERMINING RADIATION PATTERNS OF APERTURE ANTENNAS AND ITS APPLICATION

TO REFLECTOR ANTENNAS M.S. Thesis
J. Robert Paknys Sep. 1982 101 p refs
(Contract NsG-1498)
(NASA-CR-169449; NAS 1.26:169449; ESL-711965-11) Avail: NTIS HC A06/MF A01 CSCL 17I

The reflector antenna may be thought of as an aperture antenna. The classical solution for the radiation pattern of such an antenna is found by the aperture integration (AI) method. Success with this method depends on how accurately the aperture currents are known beforehand. In the past, geometrical optics (GO) has been employed to find the aperture currents. This approximation is suitable for calculating the main beam and possibly the first few sidelobes. A better approximation is to use aperture currents calculated from the geometrical theory of diffraction (GTD). Integration of the GTD currents over and extended aperture yields more accurate results for the radiation pattern. This approach is useful when conventional AI and GTD solutions have no common region of validity. This problem arises in reflector antennas. Two dimensional models of parabolic reflectors are studied; however, the techniques discussed can be applied to any aperture antenna. Author

N83-10325*# Mitre Corp., Bedford, Mass.
ON BOARD PROCESSING FOR FUTURE SATELLITE COMMUNICATIONS SYSTEMS: COMPARISON OF FDM, TDM AND HYBRID ACCESSING SCHEMES Final Technical Report
George Berk, Paul N. Jean, and Ersch Rotholz Jun. 1982 188 p refs Sponsored by NASA. Lewis Research Center
(Contract F19628-82-C-0001; AF Proj. 8680)
(NASA-CR-167931; NAS 1.26:167931; MTR-8701) Avail: NTIS HC A09/MF A01 CSCL 17B

Several satellite uplink and downlink accessing schemes for customer premises service are compared. Four conceptual system designs are presented: satellite-routed frequency division multiple access (FDMA), satellite-switched time division multiple access (TDMA), processor-routed TDMA, and frequency-routed TDMA, operating in the 30/20 GHz band. The designs are compared on the basis of estimated satellite weight, system capacity, power consumption, and cost. The systems are analyzed for fixed multibeam coverage of the continental United States. Analysis shows that the system capacity is limited by the available satellite resources and by the terminal size and cost. M.G.

N83-10326# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
A MICROWAVE PRESELECTOR FOR A GROUND STATION OPERATING AT 3.7 A AND 4.2 GHz [PRE-SELETOR DE MICROONDAS PARA ESTACAO TERRENA (3,7 A 4,2 GHZ)]
Paulo Mello Marshall and Mario de Souza Barretti Jul. 1982 23 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Sao Paulo, 6 - 14 Jul. 1982
(INPE-2463-PRE/155) Avail: NTIS HC A02/MF A01

The design of a preselector for Earth station application is described. It consists of one filter isolated by two stripline circulators. Experimental data are presented in the range 2-10 GHz. Author

N83-10327# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SYSTEM FOR BROADCASTING TELEVISION BY SATELLITE [SISTEMA DE RADIODIFUSAO DE TELEVISAO POR SATELITE]
Eduardo Antonio Parada Tude and Lucio Baptista Trannin Cividanes Jul. 1982 21 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Sao Paulo, 6-14 Jul. 1982
(INPE-2468-PRE/157) Avail: NTIS HC A02/MF A01

The essential elements of the design of a TV broadcast system by satellite are described, and the various aspects which take part in the specification of the satellite and ground reception equipment are analyzed. As an illustration, a hypothetical system for Brazil is presented, with a satellite positioned at 95 deg W. The reception equipment of this system has a 3 meter antenna diameter and the noise figure is 4 dB, in the frequency of 12 GHz. The complete coverage of Brazil is obtained with three circular beams (EIRP = 25 W) and one elliptic beam (EIRP = 6 W). Author

N83-10328 Michigan Univ., Ann Arbor.
DIRECT SEQUENCE SPREAD SPECTRUM COMMUNICATIONS: APPLICATIONS TO MULTIPLE ACCESS AND JAMMING RESISTANCE Ph.D. Thesis
Kou-Tan Wu 1981 215 p
Avail: Univ. Microfilms Order No. DA8204796

The performance of binary asynchronous direct sequence spread spectrum multiple access communication systems is analyzed in terms of the average error probability with and without the presence of white Gaussian noise. The computational complexity and the accuracy of methods which approximate the error probability with finite sums are examined. Average error probability is evaluated for the case that the chip waveform is an arbitrarily shaped, time-limited, finite energy waveform. The performance of direct sequence spread spectrum modulation when corrupted by multiple continuous wave jamming signals and white Gaussian noise is studied and the average error probability is evaluated for the single tone continuous wave jamming case. It is found that the jamming signal affects performance in proportion to a parameter that depends on the codeword chosen for the direct sequence spread spectrum signal and on the difference between the frequency of the jamming signal and the spread spectrum carrier frequency. Dissert. Abstr.

N83-10329*# City Coll. of the City Univ. of New York. Communications Systems Lab.
MODULATION TECHNIQUES
Donald L. Schilling 1982 47 p refs
(Grant NAG3-299)
(NASA-CR-169460; NAS 1.26:169460; TR-1) Avail: NTIS HC A03/MF A01 CSCL 17B

Bandwidth efficient digital modulation techniques, proposed for use on and/or applied to satellite channels, are reviewed. In a survey of recent works on digital modulation techniques, the performance of several schemes operating in various environments are compared. Topics covered include: (1) quadrature phase shift keying; (2) offset - QPSK and MSK; (3) combined modulation and coding; and (4) spectrally efficient modulation techniques. A.R.H.

N83-10330# McDonnell-Douglas Astronautics Co., St. Louis, Mo.
AIRBORNE FLIGHT TEST SYSTEM (AFTS) Final Technical Report
John A. Maynard and M. Ross 26 Oct. 1981 84 p
(Contract F33615-76-C-1002)
(AD-A115100; SD-TR-82-2) Avail: NTIS HC A05/MF A01 CSCL 17/2

The objective of the AFTS program was to demonstrate the operation of a full 1000 Mbps laser communications system transmitting from an aircraft to a ground station receiver. The system was designed around a spaceborne terminal requirements and included prototype operational components. The six years of contract activity included design of a spaceborne high data rate transmitter, adapting the space platform design to operate on a KC-135 aircraft, development and fabrication of both the ground based receiver terminal, and the airborne transmitter. In addition to hardware development of an existing site at White Sands Missile Range was modified to accommodate laser communications equipment for test activities. Supporting the hardware development a series of 5 field tests (both airborne and ground to ground) were conducted to evaluate the field operation of system design concepts and actual hardware performance. The program culminated in a final field test conducted to fully evaluate the complete system which included autonomous acquisition, tracking, 10 pbs communications, 20 Kbps beacon communications, and 500 Mbps and 1000 Mbps downlink communications.
Author (GRA)

N83-10331# Technology Service Corp., Silver Spring, Md.
ULTRALOW SIDELOBE PLANAR NEAR FIELD MEASUREMENT

STUDY Final Report, 1 Jan. - 30 Jun. 1982
K. R. Grimm 30 Jun. 1982 79 p refs
(Contract N00014-82-C-0115)
(AD-A117744; TSC-W41-142/RAD) Avail: NTIS HC A05/MF A01 CSCL 20/14

An analytic study has extended existing methods of estimating antenna pattern errors when testing by the method of planar near field probing. Improved error bounds are given for very low sidelobe levels based only on the measured near field data and known tolerances due to probe positioning and multipath. These bounds are useful for certifying array performance independent of standard far field antenna range tests. They also can serve as improved design criteria for the construction of quality near field testing systems. An optimum probe for low sidelobe testing is shown to be one which minimizes its back scatter while simultaneously contributing minimum mean square error to the sidelobe region. That this is impossible for the commonly used dominant-mode waveguide probes is shown, and a recommendation is made to design an alternate probe based on single (or small array cluster) of radial mode dipoles. Finally, the feasibility of a highly thinned measurement/processing technique is shown using existing Navy-owned near field data from a moderate sidelobe array. The principle study recommendation is to confirm the improved error estimates developed herein by conducting a test of a qualified very low sidelobe array at the National Bureau of Standards, in order to demonstrate the fundamental limits of measurement accuracy of planar near field probing. Author (GRA)

N83-10332# Naval Research Lab., Washington, D. C. Antenna Radar Branch.
END-FIRE HYBRID ARRAY ANTENNAS Interim Report
W. K. Kahn 12 Jul. 1982 22 p refs
(WF12131602)
(AD-A117414; NRL-8596) Avail: NTIS HC A02/MF A01 CSCL 17/9

A heuristic approach useful in the design of end-fire array antennas is described. When an array is scanned 'beyond end fire,' the last elements of the array, in the direction of the end-fire beam, generally receive net power transmitted by other elements of the array. This received power might conceivably be recirculated and reradiated at the price of substantial complexity in the feed network. It is relatively simple to absorb this power in appropriate resistive loads at the price of reduced gain. A compromise alternative, termination of these end elements in reactive loads especially determined to preserve pattern characteristics is examined. Author (GRA)

N83-10333# Ballistic Research Labs., Aberdeen Proving Ground, Md.
A NEW TYPE OF EM WAVE ABSORBING COATING
Arthur Gauss, Jr. 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117472) Avail: NTIS HC A02/MF A01 CSCL 11/3

Research on radar anti-reflection coatings has been actively pursued both theoretically and experimentally since World War II. Interference, (1,2) dielectric (3), and magnetic-dielectric (4,5) absorptive coatings have been tried. Recently a new type of radar absorbing chaff (RAC) has been suggested (6). Calculations done at BRL indicate that by compacting the RAC filaments a new type of radar absorbing coating (called RACO) may be possible. The filaments would be fixed in a solid binder having near unity dielectric constant. The primary mechanism for attenuation of the incident radiation by a RAC cloud or RACO layer is by resistive dissipation in the relatively long, thin chaff filaments. The tiny RAC-RACO filaments have length to diameter ratios on the order of one thousand with diameters of about 500A. Filament separations in a RACO are about one-half to one-third of a filament length thus requiring the inclusion of dipole and perhaps higher order interactions. Each filament can be modeled simply as a series resistive-capacitive circuit, single filament theory will be discussed in Section 2. GRA

N83-10334# Harry Diamond Labs., Adelphi, Md.
THE HORIZONTAL WIRE OVER EARTH AS A TRANSMISSION LINE: A MODEL SURFACE-IMPEDANCE APPROACH
Monti R. Wilson Jul. 1982 78 p refs
(DA Proj. 1L1-62120-AH-25)
(AD-A117993; HDL-TM-81-22) Avail: NTIS HC A05/MF A01 CSCL 20/14

A simple model formulation and exact solution is given for the per-unit-length surface impedance that characterizes the finite conducting Earth in a transmission-line approximation of the response of a horizontal wire over Earth to incident electromagnetic fields. The two-dimensional inhomogeneous plane waves in the model are discussed, and a transparent formulation and solution of the wave-vector dispersion relation is presented in terms of a complex refraction-angle formalism. Finally, we consider a TM (transverse magnetic) purely vector-potential model of the wire over ground in order to show that the TM surface-impedance model explicity excludes TE (transverse electric) waves and is, in fact, identical to the familiar transmission line. Author (GRA)

N83-10335# Bendix Corp., Kansas City, Mo.
RF CHARACTERIZATION OF SEMICONDUCTORS Final Report
A. G. Thomas Jun. 1982 44 p refs
(Contract DE-AC04-76DP-00613)
(DE82-016995; BDX-613-2787) Avail: NTIS HC A03/MF A01

A capability to perform RF characterization and a program for providing RF performance assurance for semiconductor devices were developed to support advanced weapon systems with all solid state radars. The activities performed and the conclusions formulated on the characterization of various categories of bipolar microwave devices are summarized. DOE

N83-10336# Felten and Guilleaume Carlswerk A.G., Cologne (West Germany).
TELECOMMUNICATION IN POWER SYSTEMS USING OPTICAL FIBRE CELLS Final Report, Dec. 1980
Siegfried Brueggendieck, Juergen Gladenbeck, Robert Herft, Friedrich Krahn, Karl Heinz Nolting, Gerhard Lejak, and Wolfgang Meininghaus Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 22 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-082; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,50

Two types of optical fibers were developed for application in electric energy distribution and switching circuits, using metallic and nonmetallic supporting elements. An optical control system for monitoring the position of switches in switching stations was developed. Their insensitivity to electromagnetic interferences makes optical fibers particularly well suited for use in power systems, if the mechanical problems can be solved. The first type is free of any conductive material. It is reinforced by glass and Aramid fibers. The second type can be used simultaneously as a high voltage conductor. An armoring of Aldrey wires provides for conductivity and tensile strength. Author (ESA)

N83-10337# Fernmeldetechnisches Zentralamt, Darmstadt (West Germany).
A METHOD FOR THE OPTIMIZATION OF LINEAR BAND-LIMITED TRANSMISSION CHANNELS FOR DIGITAL TRANSMISSION IN THE BASE BAND
vonHorst Friedrich Roeder Jan. 1982 41 p refs In GERMAN; ENGLISH summary
(FTZ-444-TBr-9) Avail: NTIS HC A03/MF A01

Digital transmission systems were optimized for a maximum signal to noise ratio at the decision point in order to achieve high transmission qualities or to better utilize cable systems by doubling of the bit rates. On the basis of linear sampled data filters a mathematical model which allows the signal waveforms in the decision point to be calculated at low computing expense and to be utilized for the optimization is given. Series representation of

the pulse response, permits a sufficiently accurate description of the time response with a small number of series coefficients without the need of numerical methods. With the simple equations for the calculation of the pulse response, it is possible to represent the eye opening in the form of a closed approximation solution and to evaluate it even with a pocket calculator. The application is demonstrated by a binary and a quaternary transmission system. Author (ESA)

N83-10338# Southampton Univ. (England). Inst. of Sound and Vibration Research.
MULTIBAND ENVELOPE TECHNIQUES FOR THE REMOVAL OF REVERBERATION AND NOISE FROM SPEECH SIGNALS
J. Mourjopoulos Apr. 1982 54 p refs
(ISVR-TR-119) Avail: NTIS HC A04/MF A01

Multiband envelope deconvolution, multiband envelope shaping, and multiband nonlinear processing (expansion) techniques for the removal of reverberation from speech signals recorded by a single microphone in rooms of different sizes were studied. The speech waveform was modelled as the product of a broad slow-varying amplitude contour (envelope function) with a phase function that incorporates the finer speech structure. In the dereverberation scheme the envelope of the reverberated signal (in a number of frequency bands) was restored to the shape of anechoic speech envelope. A realignment between the energy of the direct and reverberant signals is thus achieved. It is shown that the three techniques can be used for speech enhancement when room reverberation follows a smooth exponential decay, with no late, strong reflections. Author (ESA)

N83-10339# Engins Matra, Velizy (France).
AUTOMATIC REPEAT QUERY (ARQ), FORWARD ERROR CORRECTOR (FEC), AND HYBRID PROTECTION SYSTEMS [SYSTEME DE PROTECTION ARQ, FEC ET HYBRIDES DANS LES TELECOMMUNICATIONS PAR SATELLITE]
B. Roy 18 Feb. 1982 41 p refs In FRENCH
(DM51/BR-JP/0598-82) Avail: NTIS HC A03/MF A01

System performance criteria for error protection are reviewed and different error detection techniques are considered. Various forward error corrector (FEC) decoding systems and automatic repeat query (ARQ) coding systems are discussed. Coding systems in satellite communications are characterized. The implementation of FEC coding in time division multiple access is described. Communication efficiency is shown to be suitable and the impact on ground stations is explained. Author (ESA)

N83-10340# Reims Univ., France. Bibliotheque Univ.
UTILIZATION OF THE MATHEMATICAL THEORY OF COMMUNICATION IN INFORMATION SCIENCES [UTILISATION DE LA THEORIE MATHEMATIQUE DE LA COMMUNICATION EN SCIENCES DE L'INFORMATION]
Jean-Bernard Marino 20 Apr. 1982 50 p refs In FRENCH
(Rept-1982-ST-133) Avail: NTIS HC A03/MF A01

Assembling, coding, and knowledge which gives documentary information accessibility and usability was studied. How communication theory can contribute to these techniques was considered. Basics of communication theory are presented, including definition of information quantity, information transmission, and information transmission over a noisy channel. Applications of communication theory in information retrieval are reviewed and the limits of Shannon functions are established. A relation with signification which involves document context, a representative approach, and referential structures is outlined. Author (ESA)

N83-10341# National Bureau of Standards, Washington, D.C.
A STUDY OF THE ELECTROMAGNETIC FIELDS DISTRIBUTION INSIDE BUILDINGS WITH APERTURES EXCITED BY AN EXTERNAL SOURCE
Mark T. Ma and M. G. Arthur Feb. 1982 124 p refs Sponsored by Army Communications-Electronics Engineering Installation Agency
(PB82-193418; NBSIR-82-1659) Avail: NTIS HC A06/MF A01 CSCL 13M

Two special cases of the penetration of electromagnetic fields into a cavity, building or box are formulated and analyzed. One is to consider the case of a lossy cavity wit small apertures in free space, based on an application of the equivalence principle and the use of a generalized network formulation. It is found that the field strength at the aperture center is approximately inversely proportional to the square-root of the conductivity of the cavity walls and that high field levels can exist inside the cavity under certain physical conditions. The second case is to treat the problem of large buildings with large apertures on a practical lossy ground by a combination of theoretical approach and measurement data. Field levels inside the building for this latter case depend on the transmitter power, the transmitter-to-building distance, the ground conductivity, and the measurement antenna height relative to that of the transmitter. Author

N83-10342# Federal Communications Commission, Washington, D. C. Research and Analysis Div.
AM RECEIVER PERFORMANCE FOR 10 kHz SIGNAL SPACINGS
H. Davis, C. R. Weber, D. J. Stanks, and H. C. Harris Mar. 1982 51 p refs
(PB82-192576; FCC/OST-TM-82-1) Avail: NTIS HC A04/MF A01 CSCL 17B

Ten AM receivers were tested in order to observe the effects of a proposed AM channel spacing reduction to 9 kHz from the present 10 kHz adjacent channel spacing. The measurements indicate that a degradation of about 3 dB in RF protection or conversely in audio desired to undesired signals (D/U) would be expected on the average with 9 kHz spacing being less favorable than 10 kHz. GRA

N83-10343# National Telecommunications and Information Administration, Boulder, Colo. Inst. for Telecommunication Sciences.
ELEVATED DUCT DATA-BASE IMPROVEMENT
E. J. Dutton, D. C. Hyovalti, C. E. Lewis, and F. K. Steele Dec. 1981 51 p refs
(PB82-215906; NTIA-81-89) Avail: NTIS HC A04/MF A01 CSCL 17B

Corrections of radiosonde data, the primary source of ducting information, or the response time of the radiosonde's humidity element are reported. This correction procedure was applied for five years of radiosonde data for Washington, DC and it is found that a 25% increase in the annual occurrence of elevated ducts took place. Two types of ducting information are presented: comparing corrected and uncorrected data from the Washington, DC, source, and comparing the Washington, DC, uncorrected data with data used in another study. Overwater elevated duct occurrence data obtained from refractometer are compared with nearby, nearly simultaneous overland radiosonde data. GRA

N83-10344# Federal Communications Commission, Washington, D. C. Office of Plans and Policy.
COMPARABILITY FOR UHF TELEVISION Final Report
Philip B. Gieseler, Virginia D. Armstrong, Steven P. Brenner, Alex D. Felker, and Florence O. Setzer Sep. 1980 302 p refs
(PB82-218710) Avail: NTIS HC A14/MF A01 CSCL 17B

The attitudes and experiences of the public concerning UHF television were determined. The existence of UHF handicaps in programming, in channel selection, and in picture quality were confirmed. Information about viewers' receiving equipment is invaluable in formulating effective recommendations. GRA

33 ELECTRONICS AND ELECTRICAL ENGINEERING

Includes test equipment and maintainability; components, e.g., tunnel diodes and transistors; microminiaturization; and integrated circuitry.

For related information see also *60 Computer Operations and Hardware* and *76 Solid-State Physics.*

N83-10345* National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
COMBINATIONAL LOGIC FOR GENERATING GATE DRIVE SIGNALS FOR PHASE CONTROL RECTIFIERS Patent
Carlisle R. Dolland (AiResearch Mfg. Co., Torrance, Calif.) and Daniel W. Trimble, inventors (to NASA) (AiResearch Mfg. Co., Torrance, Calif.) Issued 21 Sep. 1982 12 p Filed 30 Jun. 1981 Supersedes N81-27402 (19 - 18, p 2477) Sponsored by NASA (NASA-Case-MFS-25208-1; US-Patent-4,351,022; US-Patent-Appl-SN-280154; US-Patent-Class-363-87; US-Patent-Class-318-803) Avail: US Patent and Trademark Office CSCL 09C

Control signals for phase-delay rectifiers, which require a variable firing angle that ranges from 0 deg to 180 deg, are derived from line-to-line 3-phase signals and both positive and negative firing angle control signals which are generated by comparing current command and actual current. Line-to-line phases are transformed into line-to-neutral phases and integrated to produce 90 deg phase delayed signals that are inverted to produce three cosine signals, such that for each its maximum occurs at the intersection of positive half cycles of the other two phases which are inputs to other inverters. At the same time, both positive and negative (inverted) phase sync signals are generated for each phase by comparing each with the next and producing a square wave when it is greater. Ramp, sync and firing angle controls signals are than used in combinational logic to generate the gate firing control signals SCR gate drives which fire SCR devices in a bridge circuit.

Official Gazette of the U.S. Patent and Trademark Office

N83-10346 Northeastern Univ., Boston, Mass.
VACUUM PUMPING PROPERTIES OF A HIGH VOLTAGE 60 Hz CROSSED FIELD DISCHARGE Ph.D. Thesis
Elizabeth Ellen Ames 1981 154 p
Avail: Univ. Microfilms Order No. DA820503

The principle of electron trapping in a.d.c. Penning discharge is used in the design of standard vacuum pumping equipment. The feasibility of achieving vacuum pumping using high 60 Hz a.c. voltages and permanent magnets arranged to form a crossed field configuration is investigated here. The applications are to use the voltages inherently available in high voltage vacuum insulated power apparatus to cause a vacuum pumping action. This would create a self maintained vacuum without employing an auxiliary vacuum pump. The objective is to maintain a vacuum in the face of outgassing in systems of large surface area over long periods of time, and not necessarily to obtain a fast pump down of the system. Vacuum insulation of underground power cables would require pumps to maintain the vacuum while the cable remains underground for long periods of time. Other applications are in vacuum circuit breaker, lightning arrester, and surge arrester designs. Two devices were designed, built and tested which utilize high 6 Hz a.c. voltages and permanent magnets to generate a crossed field discharge. Dissert. Abstr.

N83-10347 Florida Univ., Gainesville.
THE TRICKY-FIX SIGNAL PROCESSOR Ph.D. Thesis
Peter Alexander 1981 554 p refs
Avail: Univ. Microfilms Order No. DA8203650

The performance of several constant false alarm rate signal processors are compared and evaluated. They are used to detect sine waves in white Gaussian noise. In order to accomplish this objective, a knowledge of the output voltage probability density function (pdf) for each processor is required. These probability density functions are obtained experimentally, because of difficulty encountered in obtaining them analytically. They are then used to obtain probability of false alarm (P sub fa) curves, receiver operating curves (ROCs) and Performance Tables for the Single Channel Tricky-Fix with Square Law Detector, the Dual Channel Tricky-Fix with Adder, the Dual Channel Tricky-Fix with Multiplier and the Dual Channel Digital Multiplier Processor. Further, each experimental output voltage pdf is compared to a second and third moment pdf curve derived from the experimental output voltage moments. Then each second and third moment pdf curve is used to obtain either a second and third moment P sub fa curve, respectively (for noise alone) or a second and third moment respectively (for signal plus noise). Dissert. Abstr.

N83-10348*# AiResearch Mfg. Co., Torrance, Calif.
A LIGHTWEIGHT ELECTRONICALLY COMMUTATED DC MOTOR FOR ELECTRIC PASSENGER VEHICLES Final Report
E. F. Echolds and P. S. Walia 1 Sep. 1982 96 p refs
(Contracts DEN3-64; DE-AI01-77CS-51044)
(NASA-CR-165601; NAS 1.26:165601; AMC-81-18266) Avail: NTIS HC A05/MF A01 CSCL 09A

A functional model breadboard converter and a rare-earth-cobalt, permanent magnet motor; as well as an engineering model converter and PM motor suitable for vehicle installations were developed and tested. The converter and motor achieved an 88% peak efficiency, a maximum output of 26 kW at 26,000 rpm, and a continuous rating of 15 kW. The system also generated power to the source during braking, with a demonstrated peak power available at the converter terminals of approximately 26 kW at 88% efficiency. Major conclusions include: (1) the SAE J227a(D) driving cycle efficiency for the converter/motor is 86% to 88% when energy available for recovery at the converter terminals is included; (2) the converter initial cost is approximately five times that of the permanent magnet motor, but can be reduced by means of LSI logic and integrated liquid cooled semiconductor packages; and (3) an electronically commutated motor with a liquid cooled converter will operate reliably without service or maintenance for the life of a passenger vehicle. A.R.H.

N83-10349*# General Electric Co., Schenectady, N. Y. Power Electronics Lab.
IMPROVED TRANSISTORIZED AC MOTOR CONTROLLER FOR BATTERY POWERED URBAN ELECTRIC PASSENGER VEHICLES Final Report
Steven C. Peak Sep. 1982 242 p refs
(Contracts DEN3-59; DE-AI01-77CS-51044)
(NASA-CR-167978; DOE/NASA/0059-82/1; NAS 1.26:167978; SRD-81-088) Avail: NTIS HC A11/MF A01 CSCL 09C

An ac motor controller for an induction motor electric vehicle drive system was designed, fabricated, tested, evaluated, and cost analyzed. A vehicle performance analysis was done to establish the vehicle tractive effort-speed requirements. These requirements were then converted into a set of ac motor and ac controller requirements. The power inverter is a three-phase bridge using power Darlington transistors. The induction motor was optimized for use with an inverter power source. The drive system has a constant torque output to base motor speed and a constant horsepower output to maximum speed. A gear shifting transmission is not required. The ac controller was scaled from the base 20 hp (41 hp peak) at 108 volts dec to an expanded horsepower and battery voltage range. Motor reversal was accomplished by electronic reversal of the inverter phase sequence. The ac controller can also be used as a boost chopper battery charger. The drive system was tested on a dynamometer and results are presented. The current-controlled pulse width modulation control scheme yielded improved motor current waveforms. The ac controller favors a higher system voltage. A.R.H.

N83-10350*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
TOTAL-DOSE RADIATION EFFECTS DATA FOR SEMICONDUCTOR DEVICES, VOLUME 3
William E. Price, Keith E. Martin, Donald K. Nichols, Michael K.

Gauthier, and S. Frederick Brown 1 Sep. 1982 116 p ref 3 Vol.
(Contract NAS7-100)
(NASA-CR-169430; JPL-Pub-81-66-Vol-3; NAS 1.26:169430) Avail: NTIS HC A06/MF A01 CSCL 09C

Volume 3 of this three-volume set provides a detailed analysis of the data in Volumes 1 and 2, most of which was generated for the Galileo Orbiter Program in support of NASA space programs. Volume 1 includes total ionizing dose radiation test data on diodes, bipolar transistors, field effect transistors, and miscellaneous discrete solid-state devices. Volume 2 includes similar data on integrated circuits and a few large-scale integrated circuits. The data of Volumes 1 and 2 are combined in graphic format in Volume 3 to provide a comparison of radiation sensitivities of devices of a given type and different manufacturer, a comparison of multiple tests for a single data code, a comparison of multiple tests for a single lot, and a comparison of radiation sensitivities vs time (date codes). All data were generated using a steady-state 2.5-MeV electron source (Dynamitron) or a Cobalt-60 gamma ray source. The data that compose Volume 3 represent 26 different device types, 224 tests, and a total of 1040 devices. A comparison of the effects of steady-state electrons and Cobat-60 gamma rays is also presented. Author

N83-10351# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
HYBRID MICROWAVE FILTERS USING INTERDIGITAL AND HAIRPIN MICROSTRIP RESONATORS [FILTROS HIBRIDOS DE MICROONDAS QUE UTILIZAM RESSOADORES INTERDIGITAIS E HAIRPIN EM MICROFITA]
Paulo Mello Marshall May 1982 18 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Brazil, 6-14 Jul. 1982
(INPE-2411-PRE/120) Avail: NTIS HC A02/MF A01

A design procedure of microwave hybrid filters using interdigital and hairpin microstrip resonators is described. The design is based on experimental results obtained for the coupling between pairs of resonators and is suitable for the synthesis of wide band filters (over 20%). The viability of the procedure described is verified with the performance of a 1.3 GHz hyrid filter, with a 20% bandwidth. Author

N83-10352# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
ADAPTIVE ESTIMATION OF STATE NOISE IN A KALMAN FILTER [ESTIMACAO ADAPTATIVA DO RUIDO NO ESTADO PARA O FILTRO DE KALMAN]
Atair Rios Neto and Helio Koiti Kuga Jun. 1982 7 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Brazil. Congr. on Automation, Sao Paulo, Brazil, 14-17 Sep. 1982
(INPE-2440-PRE/141) Avail: NTIS HC A02/MF A01

In the presence of estimates, divergence due to errors in system dynamics modelling and to algorithm numerical ill-conditioning, Kalman filter usefulness is seriously impaired. A procedure to estimate the state noise level adaptively and in real time in order to represent the errors and to prevent divergence is proposed. The adequate noise level is adjusted by using a criterion of statistical consistency between estimated errors and observation residuals. Results of preliminary tests, in the case of artificial satellite orbit determination in real time, are presented and show the procedure capability of avoiding divergence and of giving results of acceptable accuracy. S.L.

N83-10353# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
DESIGN OF 3 dB HYBRID COUPLERS USING JUXTAPOSED STRIP LINES IN HOMOGENEOUS DIELECTRICS [PROJETOS DE ACOPLADORES HIBRIDOS DE 2 DB, QUE USAM LINHAS DE FITA JUSTAPOSTAS, EM DIELETRICOS HOMOGENEOS]
Benjamin da Silva M. C. Galvao and Wilton Jose Fleming Jun. 1982 19 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Sao Paulo, 6-14 Jul. 1982
(INPE-2453-PRE/149) Avail: NTIS HC A02/MF A01

Three dB hybrid couplers using striplines in homogeneous dielectrics are discussed. The experimental curves for return loss, isolation and coupling are shown. S.L.

N83-10354# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
THE STABILIZATION OF MICROWAVE OSCILLATORS USING CYLINDRICAL DIELECTRIC RESONATORS M.S. Thesis [ESTABILIZACAO DE OSCILADORES DE MICROONDAS UTILIZANDO RESSOADORES DIELETRICOS CILINDRICOS]
Paulo Mello Marshall May 1982 107 p refs In PORTUGUESE; ENGLISH summary
(INPE-2403-TDL/090) Avail: NTIS HC A06/MF A01

The design of microstrip microwave oscillators stabilized by cylindrical dielectric resonators is presented. A method is described for the determination of the resonance frequency and tuning range of a cylindrical dielectric resonator placed in an inhomogeneous media. The design of two dielectric resonators stabilized oscillators in different configurations uses experimental results obtained for the characterization of the coupling of the resonator to a microstrip line and is based on the scattering parameters theory. Characteristics of the performance of the oscillators are presented and compared to those of conventional microwave oscillators. In view of their performance and excellent integrability with microstrip circuits, the dielectric resonator stabilized oscillators represent an attractive option for a great variety of microwave receivers. S.L.

N83-10355# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
MICROWAVE OSCILLATOR STABILIZED BY A DIELECTRIC RESONATOR AT 5.4 GHz [OSCILADOR DE MICROONDAS ESTABILIZADO FOR UM RESSOADOR DIELETRICO EM 5,4 GHZ]
Paulo Mello Marshall and Carlos Eduardo Santana Jun. 1982 14 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC, Campinas, Brazil, 6-14 Jul. 1982
(INPE-2436-PRE/137) Avail: NTIS HC A02/MF A01

A dielectric resonator stabilized oscillator at 5.43 GHz is described. The dielectric resonator, magnetically coupled to a microstrip line, is the principal element of the tuning network connected to the input port of a feedback transistor. With this procedure, an oscillator with a broad tuning band without hysteresis is obtained. At 5430670 kHz the oscillator shows low phase noise and thermal stability of about + or - 2.2 ppm/C. Curves of the tuning range and oscillator spectrum are presented. S.L.

N83-10356 North Carolina State Univ., Raleigh.
THE ELECTRICAL PROPERTIES OF THE ANODIC OXIDE/GaAs INTERFACE Ph.D. Thesis
Varadarajan Srinivasan 1981 126 p
Avail: Univ. Microfilms Order No. DA812850

The n-GaAs/anodic oxide interface was characterized by capacitance-voltage (C-V) measurements on MOS capacitors and current-voltage measurements on Schottky barriers. The n-GaAs/anodic oxide interface exhibits a capacitance-voltage frequency dispersion that cannot be explained by a simple interface state model. Results obtained are presented to show the presence of a thin compensated layer in GaAs near the interface on anodized and subsequently annealed GaAs surfaces. Thin compensated layer lends to a maximum in the energy bands near the interface. Based on these observations, a model is formulated which can explain many aspects of the n-GaAs/anodic oxide interface including the accumulation mode capacitance dispersion. Studies made on oxides grown in different thicknesses and then etched to the same thickness show that C-V dispersion is related to the thickness of the oxide grown and the current density during anodization. A correlation between the temperature during anodization and the interface properties is also found. Oxides grown at elevated temperatures show significantly more dispersion than oxides grown low temperatures. Results are also presented on charge instabilites observed on n-GaAs MOS devices.
Dissert. Abstr.

N83-10357# Defence Research Information Centre, Orpington (England).

THE METAL-CERAMIC X-RAY TUBE
H. Mohr Jun. 1982 15 p refs Transl. into ENGLISH of Roentgenpraxis (West Germany), v. 33, no. 12, 1980 p 309-314 (DRIC-T-6676; BR83882) Avail: NTIS HC A02/MF A01

An X-ray tube with higher spatial resolution, better contrast, filtering and cooling, and a longer working life than conventional tubes is described. The tube has a steel outer jacket which is maintained at earth potential. The high voltage is applied directly to the anode and cathode. The anode is supported along its axis on two sides. An additional ceramic insulator serves as a potential separation between the anode axis and the rotor. Distances between stator and rotor are significantly smaller by comparison with the glass tube, and the efficiency of the motor for starting the anode is improved. The supporting of the anode on both sides, and the stable metal design on the X-ray tube, permit the use of heavy anode plates and an increase in the diameter of the focal spot path. Author (ESA)

N83-10358# Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
FAULT DIAGNOSIS OF NONLINEAR ANALOG CIRCUIT. VOLUME 2: A MULTIFREQUENCY METHOD FOR SOFT FAILURE ANALYSIS
L. Rapisarda and R. DeCarlo Jul. 1982 135 p refs 2 Vol.
(Contract N00014-81-K-0323)
(AD-A117568; TR-EE-82-22) Avail: NTIS HC A07/MF A01 CSCL 09/5

Multifrequency testing of interconnected analog circuits assuming soft failures is discussed. In particular the two approaches to soft failure multifrequency diagnosis are detailed: the composite system transfer function approach and the tableau approach. The two approaches are evaluated theoretically and numerically with the tableau approach shown to be far superior. In the context of the tableau approach a diagnosability set is developed and upper and lower bounds on the number of test frequencies necessary to conduct a diagnosis are given. Investigations of various other aspects of the tableau fault diagnosis equations are included. In particular, a detailed investigation of the quadratic nature of the tableau equations is presented. By exploiting this quadratic structure superior numerical algorithms for the solution of the diagnosis equations arise. R.J.F.

N83-10359# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
VOLTAGE BREAKDOWN OF SPARK GAPS IN COMPRESSED GASES
W. Pfeiffer 7 Jun. 1982 22 p refs Transl. into ENGLISH from Z. fuer Angewante Phys. (West Germany), no. 4, 1971 p 265-273
(AD-A117467; FTD-ID(RS)T-0735-82) Avail: NTIS HC A02/MF A01 CSCL 20/3

The validity of the spark laws of Toepler, Rompe-Weizel, and Braginskii were checked in a wide range of gap widths, pressures, and gasses. The time interval of the voltage breakdown at the spark gap was the only factor considered in the determination of spark constants. Measurements demonstrate that under these conditions, all of the spark laws are valid. The Toepler law resulted in the best accuracy and was the most easily applied. J.D.

N83-10360# Thomas Electronics Inc., Wayne N. J. Engineering Dept.
MANUFACTURING METHODS AND TECHNOLOGY (MM&T) SPECIFICATIONS FOR MINIATURE CATHODE RAY TUBE Quarterly Report, 1 Jan. - 31 Mar. 1982
F. M. Bruno 30 Apr. 1982 16 p
(Contract DAAK70-80-C-0168)
(AD-A117532; TEI-A009-6; QR-6) Avail: NTIS HC A02/MF A01 CSCL 09/1

TEI continued to evaluate materials and components intended for use in fabrication of CRT assemblies for the 3rd Submission of Phase 1 Engineering Samples: (1) Life-testing of the P43 phosphor with the fiber optic faceplate and the clear faceplate, and (2) The 1.3" radius fiber optic faceplate and the latest yoke design. A vendor-caused delay was experienced in the planned evaluation of seamless, versus regular-production lap-seam, Mu-metal shields. TEI's newly-constructed in-house equipment became operational to duplicate the EM's conditions for the sine-wave modulation response test. TEI made recommendations to modify testing requirements specified in the contract and the MM&T project, in order to reduce an appreciable delay in the scheduled completion date. Author (GRA)

N83-10361# Martin Marietta Aerospace, Orlando, Fla.
MANUFACTURING TECHNIQUES OF LARGE SCALE HYBRID MICROELECTRONICS Final Technical Report, Oct. 1978 - Oct. 1981
Lee Mirth and Connie Gill Nov. 1981 92 p
(Contract DAAK40-78-C-0251)
(AD-A117542; OR-16962) Avail: NTIS HC A05/MF A01 CSCL 13/8

The purpose of this Manufacturing Methods and Technology (MM&T) contract was to develop the manufacturing technology necessary to design, fabricate, test, and rework large scale hybrid (LSH) microcircuits with cost effective yields and to evaluate the capability of such assemblies to withstand extreme environments. Processing data and backplate reinforcement information is included. Author (GRA)

N83-10362# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
OPTIMAL DESIGN OF MULTIPLE TUBE GRAIN AND THEIR ARRANGEMENT
Zhao Baihua 29 Jun. 1982 24 p refs Transl. into ENGLISH from Acta Armanentarii (China), no. 4, 1981 p 9-22
(AD-A117545; FTD-ID(RS)T-0523-82) Avail: NTIS HC A02/MF A01 CSCL 21/9

Four arrangement methods of multiple tube grain in the combustion chamber and the theoretic calculating formulae for the grain number n and relative exterior diameter D are presented. Several formulae for computing grain number n in the hexagonal crowded arrangement were corrected. Results of the computer calculations were optimized. Finally, a group of grain design curves were given to meet the requirements of various xx web coefficients. These curves have practical significance to the grain design of some missiles, rocket launchers, and rocket boosters. Author

N83-10363# California Univ., Livermore. Lawrence Livermore Lab.
SPECTRAL RESPONSE FUNCTIONS OF LARGE-DIAMETER TUBULAR XENON FLASHLAMPS AT DIFFERENT TIMES
L. I. Gavrilova and V. G. Ignatev Nov. 1981 10 p refs Transl. into ENGLISH from Impulsnaya Fotometriya (USSR), no. 2, 1972 p 135-144
(Contract W-7405-eng-48)
(DE82-010641; UCRL-Trans-11752) Avail: NTIS HC A02/MF A01

The temporal spectral response functions are investigated for straight tubular lamps having inside diameters of 18, 26, and 35 mm operating at peak current densities from 1 to 3.5 kA/cm(2) for light-pulse durations of 0.5, and 1.0 msec at 0.35 the peak level. It is found that at the beginning of the discharge and at its end, the radiation includes numerous pronounced lines in addition to a strong background, characteristic of the optically transparent discharges of continuous-arc xenon lamps. As the current passes through the maximum, the radiation approaches that of an ideal black body. DOE

N83-10364# Midwest Research Inst., Golden, Colo.
IMAGING RADIOMETRY SYSTEMS
Theodore W. Cannon Jun. 1982 15 p refs Presented at the PMA Seminar-Optical Radiation Measurements, Standards, and Instrumentation, Boulder, Colo., 2-4 Jun. 1982
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-015862; SERI/TP-215-1636) Avail: NTIS HC A02/MF A01

Imaging radiometry systems are used to measure the spatial distribution of radiant energy. An overview is given of television camera tubes, solid state camera detectors and pyroelectric imaging detectors usable in these systems. Some comments about system parameters which must be considered in development of imaging radiometers are included. As an example, a solar flux mapper used for mapping all-sky luminance, inner-model luminance, and focused flux irradiance is described; examples of the data are given. DOE

N83-10365# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
USER'S MANUAL FOR LINEAR, A COMPUTER PROGRAM THAT CALCULATES THE LINEAR CHARACTERISTICS OF A GYROTRON
K. E. Kreischer Jan. 1982 23 p refs
(Contract DE-AC02-78ET-51013)
(DE82-012569; DOE/ET-51013/36) Avail: NTIS HC A02/MF A01

A program which calculates the linear characteristics of a gyrotron is presented. This program is capable of: (1) calculating the starting current or frequency detuning for each gyrotron mode; (2) generating mode spectra; (3) plotting these linear characteristics as a function of device parameters; and (4) doing the above for any axial RF field profile. DOE

N83-10366# Wisconsin Univ., Madison. Dept. of Physics.
PROTECTION OF LARGE CAPACITOR BANKS
J. C. Sprott and T. W. Lovell Jun. 1982 15 p
(Contract DE-AC02-76ET-53051)
(DE82-017353; DOE/ET-53051/41) Avail: NTIS HC A02/MF A01

Large capacitor banks, as used in many pulsed plasma experiments, are subject to catastrophic failure in the event of a short in the output or in an individual capacitor. Methods are described for protecting such banks to minimize the damage and down time caused by such a failure. DOE

N83-10367# General Electric Co., Schenectady, N. Y. Corporate Research and Development Center.
PHOTOTRANSISTOR SWITCH FOR BREAKER APPLICATIONS Final Report
V. A. K. Temple and F. W. Holroyd May 1982 115 p refs
(EPRI Proj. 1511-1)
(DE82-904374; EPRI-EL-2395) Avail: NTIS HC A06/MF A01

An effort to develop a directly light-driven transistor with a view toward installing it in parallel with the mechanical breaker to relieve the stresses inherent in opening a mechanical circuit is described. This development divides into 3 main areas: first, the development of process suitable for fabricating high voltage transistors; second, a comprehensive set of calculations covering the most important aspects of design, fabrication, and operation of the device; and third, experimental measurements on prototype devices fabricated using the process developed. The calculations indicate that although it is possible to fabricate a high voltage-high current phototransistor, such a device is inherently incapable of operating efficiently under those conditions. This was verified on prototype devices which did achieve 1200V breakdown voltage, and did operate at up to 230 A-cm(2), but whose gain, even after amplification in a Darlington configuration, reached only about 40 before falling off again at high currents. DOE

N83-10368# Siemens A.G., Berlin (West Germany). Bereich Energietechnik.
FUNDAMENTAL RESEARCH INTO HIGH VOLTAGES FOR FURTHER DEVELOPMENT OF ELECTRIC POWER DISTRIBUTION SYSTEMS Final Report, Dec. 1980
Ernst Gockenbach, Werner Buch, Michael Crucius, Armin Diessner, and Harro Luehrmann Bonn Bundesministerium fuer Forschung und Technologie May 1982 111 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-064; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 23,50

In order to guarantee correct electric power distribution, the use of voltages between 765 and 1200 kV was investigated. This fundamental research was conducted in an 1800 kV outdoor test station. After describing the connection and protection devices of the three stage high voltage generating transformer, and the tested equipment which has to withstand humidity, rain, dirt accumulation, snow, ice, and wind, the recording equipment and the transient measurements which result from breakdowns in the SF6 gas insulated equipment and from flashovers in long air gaps, are presented. To limit the effects of high voltage oscillation, damping resistance and short cicuiting equipment on the primary side of the transformers were used. In this way, the overvoltages were prevented from rising to dangerous levels. Author (ESA)

N83-10369# Linde A.G., Hollriegelskreuth (West Germany). Werksgruppe TVT.
REFRIGERATION SYSTEM OF SUPERCONDUCTING GENERATORS FOR LARGE POWER PLANTS Final Report, Apr. 1980
Reinhard Glatthaar Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 105 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-071; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

An electric generator with superconductor field windings with a capacity of 1000 to 2000 MVA was considered. No reliable equipment for refrigeration exists in order to adopt this technique in a power plant. The basic equipment, including the specifications of machines and apparatus, and a reliability study of such equipment able to function without maintenance more than 30,000 hours, were worked out. The selected cooling system consists of a compressor, a battery of heat exchangers, and a dewar liquid helium storage tank at a pressure of 1.2 bars and with a capacity of 5 m3. The liquid helium flows to the generator rotor and gaseous helium with ambient conditions leaves the generator and is fed to the refrigerator for reliquification. A quantity of 5 g/sec of liquid helium is required for a generator with a capacity of 1000 MVA. The equipment and the exploitation method are described, e.g., starting of cooling the installation, starting of cooling dewar container, starting of cooling generator, stopping of installation, behavior under variable charge conditions, and short breakdown of cooling equipment. The construction and the testing of a helium cooling system is mentioned. Author (ESA)

N83-10370# Kabelmetal Electro G.m.b.H., Hannover (West Germany).
FLEXIBLE GAS INSULATED CABLE FOR HIGH POWER TRANSMISSION Final Report, Sep. 1981
Jan Artbauer and Werner Renftel Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 105 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-099; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 22

The dielectric losses which increase as the square of voltage and limit power transmission capacity of paper/oil impregnated isolated cables were studied. This limitation disappears by using gas insulation. Tube transmission lines isolated with SF6 gas were developed. Their conception was paired with a lot of inconveniences: short length, numerous connections, special curved sections and necessity of dilation joints. A test cable was fabricated from Al wire conductors, epoxy resin spacer insulators, and an external sheath of 3 mm thick Al-Mn alloy strip. A special high tension testing device was also constructed. The development of such a cable for 220 kV and of its components involved electric field computations, electrical, mechanical, and thermal measurements, elaboration of test and calculation methods, manufacture and testing of cable samples. Tests show that the transmission capacity of the cable in air surpasses 1000 MVA.

Due to the limits set by the sheath diameter and the gas pressure, the 380 kV level cannot be attained with the design. Author (ESA)

N83-10371# Siemens A.G., Munich (West Germany). Unternehmensbereich Bauelemente.
INTRODUCTION OF AN ELECTRON BEAM MASKPRINTER SYSTEM FOR LSI MASKMAKING Final Report, Apr. 1980
Manfred Baute, Hilmar Demuschewski, Arnim Mueller, Andreas Oelmann, and Dusan Sofronijevic Bundesministerium fuer Forschung und Technologie Jul. 1982 74 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-110; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15,50

An MEBES machine with its special maskmaking process line was studied. The maskmaking is directly controlled by the pattern data without any intermediate step. The acceptability tests, running in, the choice of the mask resins and of the fabrication of block reticles are described. Standards and indications about the software necessary for controlling the MEBES machine are reviewed. It is shown that the electron beam printing directly on the silicium wafers is a reliable production method. Author (ESA)

N83-10372# Bosch (Robert) G.m.b.H., Stuttgart (West Germany).
INVESTIGATION OF THE BEHAVIOR OF NOISE-SENSITIVE ELECTRONIC CIRCUITS FOR AUTOMOTIVE APPLICATIONS WITH PARTICULAR ATTENTION TO MOS CIRCUITS
Goreille Ingo Bonn Bundesministerium fuer Forschung und Technologie Nov. 1980 96 p refs Transl. into ENGLISH of "Untersuchung des Verhaltens Stoersicherer Schaltkreise fuer die Anwendung im Kraftfahrseug unter Besonderer Beruecksichtigung von MOS-Schaltkreisen" rept. Bundesministerium fuer Forschung und Technologie, Bonn Sponsored by the Bundesministerium fuer Forschung und Technologie
(PB82-211392) Avail: NTIS HC A05/MF A01 CSCL 09E

The applicability of MOS circuits with high complexity to essential automobile systems are investigated. A bipolar circuit technology, CHL (Current Hogging Logic), was compared to MOS technologies for its competitiveness. Functional requirements on digital automotive systems can only be met by technologies allowing large packing densities and medium speeds > 500 kHz. Both n-MOS and C-MOS exhibit promising properties whereas electric power needed by p-MOS circuits is in general prohibitively large. Reliability of LSI C-MOS circuits was very good. CHL is an extremely noise immune bipolar technology which, however, performs at low speeds only and also does not compare favorably to MOS technologies with respect to packing density. On the other hand, CHL can be regarded as an interesting technological alternative for small and medium size systems which need analog and digital functions on the same chip. GRA

N83-10373# National Academy of Sciences - National Research Council, Washington, D. C. High Energy Density Capacitors and Dielectric Materials Committee.
PROCEEDINGS OF A SYMPOSIUM ON HIGH ENERGY DENSITY CAPACITORS AND DIELECTRIC MATERIALS
Clive W. Reed, ed. 1981 204 p refs Symp. held at Boston, 28 Oct. 1980 Prepared for Sandia National Labs.
(PB82-197344) Avail: NTIS HC A10/MF A01 CSCL 09A

Several diverse applications, space satellites, weapons, laser fusion, and specialized power supplies, demand capacitors with higher energy densities (in joules per gram) than are ordinarily available in commercial capacitors for industrial and utility applications. Such high energy density capacitors experience a wide variety of duty cycles (from single pulses to continuous operation) and require special features such as compactness, lightness, long shelf life, or very high reliability. The state of the art in high energy density capacitor technology is summarized, and areas of that technology in particular need of improvement are identified. GRA

N83-10374# Valvo G.m.b.H., Hamburg (West Germany).
APPLICATION OF ION IMPLANTATION IN THE MANUFACTURING OF MONOLITHIC BIPOLAR ANALOGUE INTEGRATED CIRCUITS
W. Dietsch, A. Gakis, N. Hofmann, W. Nolde, and U. Suckow Dec. 1980 78 p refs Transl. into ENGLISH from Anwendung der Ionenimplantation bei der Herstellung Bipolarer Analogschaltungen in Monolithischer Bauweise Original language document available as N82-10341 Sponsored by Bundesministerium fuer Forschung und Technologie
(PB82-214067; BMFT-FB-T-80-147) Avail: NTIS HC A05/MF A01 CSCL 09E

The application of ion implantation for bipolar analogue integrated circuits was investigated under different aspects of bipolar technology. The main items are: high frequency transistors; bases; resistors (especially those with a high resistance); passivation methods; and components. The existing doping methods are replaced by more controllable ion implantation and processes are developed which can only be realized by ion implantation. In both cases, processes are developed with technological as well as economical advantages concerning standard technologies. GRA

N83-10375# Science Research Council, Chilton (England).
THE USE OF THE COMPUTER CODE PE2D IN THE ELECTROSTATIC MODELLING OF AN ELECTRON BEAM GENERATOR VACUUM DIODE INTERFACE
C. S. Biddlecombe, C. B. Edwards, and M. J. Shaw 1981 14 p refs
(PB82-174384) Copyright. Avail: NTIS HC A02/MF A01 CSCL 09A

The computer code PE2D has been used to optimize the design of a compact, 500 kV, low inductance vacuum diode interface assembly for SPRITE, a sophisticated electron beam pumped exciplex laser system under construction at RAL. Electrostatic modelling of various dielectric interfaces has been achieved in cylindrical symmetry under conditions not amendable to more traditional methods of electrostatic field plotting. Author (GRA)

N83-10376# National Bureau of Standards, Washington, D.C. Semiconductor Devices and Circuits Div.
CS1: A TWO-DIMENSIONAL FINITE ELEMENT CHARGE-SHEET MODEL OF A SHORT-CHANNEL MOS TRANSISTOR
C. L. Wilson and J. L. Blue Apr. 1982 63 p refs
(PB82-205709; NBSIR-82-2471) Avail: NTIS HC A04/MF A01 CSCL 09A

A two dimensional charge sheet model for short channel MOS transistors was developed. The unique feature of the model is that the effect of channel inversion layer charge is included as a nonlinear integral boundary condition on the two dimensional electrostatic fluid in the transistor. The average inversion layer charge density and source drain current are obtained directly from the model rather than from the electron density or electron quasi-Fermi level. The model retains all of the physical detail of more complex two dimensional models such as sensitivity to source drain profile shape, channel profile, and oxide field shape. This allows the model to represent the changes in drain current associated with short channel effects while still allowing simple comparison with long channel models. For long channel transistors, the results of this model are identical to Brevs' long channel charge sheet model. The accuracy of this model is verified by modelling a sequence of transistors with channel lengths between 4.6 and 1.1 micron. In short channel transistors, effects previously attributed to high field mobility are explained by simple two dimensional electrostatics. The simulations produced using this model were compared to experimental measurements on an array of n-channel MOSPETs; the model is in good agreement for transistors with channel lengths as short as 1.1 micron. In this verification process, the model represented accurately the onset of subthreshold current, channel length induced threshold voltage offset, and drain field induced output conductance changes. GRA

34 FLUID MECHANICS AND HEAT TRANSFER

Includes boundary layers; hydrodynamics; fluidics; mass transfer; and ablation cooling.

For related information see also *02 Aerodynamics* and *77 Thermodynamics and Statistical Physics.*

N83-10377# British Library Lending Div., Boston Spa (England).
PROGRAMME SYSTEM GANESI. DOCUMENTATION REPORT 1: OPERATING INSTRUCTIONS
A. Weimann and K. Wanka 15 Sep. 1982 46 p Transl. into ENGLISH of rept. from Technische Univ., Munich, Sep. 1976
(BLL-T5870/BGLRS/T586(9022.048)) Avail: British Library Lending Div., Boston Spa, Engl.

The program system GANESI is a digital computer program for the simulation of gas grids in gas distribution networks. The gas grids may be intermeshed in any arbitrary manner and may include regulators (controllers), compressors, and gas valves. As fluid media are admitted gases and gas mixtures, the performance (behavior) of which in the high pressure range is allowed for by the real gas factor. The system permits the simulation of flow phenomena ranging from slow nonsteady patterns with equalization times extending over hours to fast patterns with equalization times in the range of minutes. In the program system GANESI the modelling of the controllers, compressors, gas valves, and the data input structure is specifically designed to simulate large high pressure gas distribution networks. S.L.

N83-10378*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
HOLOGRAPHIC INTERFEROMETRY TECHNIQUE FOR ROTARY WING AERODYNAMICS AND NOISE
John K. Kittleson and Yung H. Yu [1981] 15 p refs Presented at the Army Sci. Conf., West Point, N.Y., 15-18 Jun. 1982 Prepared in cooperation with Army Aviation Research and Development Command, Moffett Field, Calif.
(NASA-TM-84723; NAS 1.15:84723; AD-A117425) Avail: NTIS HC A02/MF A01 CSCL 20D

The concepts of holography and holographic interferometry, as applied to the visualization and measurement of the three dimensional flow field near a rotor tip, are previewed, and initial experimental results of investigations of local shock structures and tip vortices behind the blade are presented. An additional method to visualize the flow in a three dimensional manner is demonstrated, and finally, a method to quantitatively measure the three dimensional flow, which will provide the necessary information to help improve helicopter performance and reduce noise, is introduced. Author

N83-10379*# Hughes Aircraft Co., Torrance, Calif. Electron Dynamics Div.
FABRICATION AND DEVELOPMENT OF SEVERAL HEAT PIPE HONEYCOMB SANDWICH PANEL CONCEPTS Final Report
H. J. Tanzer Jun. 1982 55 p refs
(Contract NAS1-16556)
(NASA-CR-165962; NAS 1.26:165962) Avail: NTIS HC A04/MF A01 CSCL 20D

The feasibility of fabricating and processing liquid metal heat pipes in a low mass honeycomb sandwich panel configuration for application on the NASA Langley airframe-integrated Scramjet engine was investigated. A variety of honeycomb panel facesheet and core-ribbon wick concepts was evaluated within constraints dictated by existing manufacturing technology and equipment. The chosen design consists of an all-stainless steel structure, sintered screen facesheets, and two types of core-ribbon; a diffusion bonded wire mesh and a foil-screen composite. Cleaning, fluid charging, processing, and process port sealing techniques were established. The liquid metals potassium, sodium and cesium were used as working fluids. Eleven honeycomb panels 15.24 cm X 15.24 cm X 2.94 cm were delivered to NASA Langley for extensive performance testing and evaluation; nine panels were processed as heat pipes, and two panels were left unprocessed. Author

N83-10380*# California Univ., Davis.
TURBULENT TRANSPORT MODELLING OF SEPARATING AND REATTACHING SHEAR FLOWS Final Report, Aug. 1977 - 31 Jan. 1981
B. E. Launder Sep. 1982 23 p refs
(Grant NsG-2256)
(NASA-CR-169368; NAS 1.26:169368) Avail: NTIS HC A02/MF A01 CSCL 20D

The improvement of capabilities for computer simulation of turbulent recirculating flows was investigated. Attention has been limited to two dimensional flows and principally to statistically stationary motion. Improvement of turbulence modeling explored the treatment of the near wall sublayer and of the exterior fully turbulent region, working within the framework of turbulence closures requiring the solution of transport equations for the turbulence energy and its dissipation rate. The work on the numerical procedure, based on the Gosman-Pun program TEACH, addressed the problems of incorporating the turbulence model as well as the extension to time dependent flows, the incorporation of a third order approximation of convective transport, and the treatment of non-orthogonal boundaries. J.D.

N83-10381# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
JET RESPONSE TO PURE TONE EXCITATION
Hu Zhangwei (Nanjing Aeronautical Inst.) Jan. 1982 28 p refs Sponsored in part by Natural Sciences and Engineering Research Council
(UTIAS-TN-232; ISSN-0082-5263) Avail: NTIS HC A03/MF A01

Turbulence spectra in an axisymmetric air jet subjected to a symmetrical pure tone excitation were measured. Measurements were carried out in the mixing region and the transition region of the jet. The experimental investigation suggests that the ratio of the excitation Strouhal number St sub e to the preferred jet Strouhal number St sub d (corresponding to dominant frequency in the jet core) governs the development of the turbulence of the jet flow field. Author

N83-10382# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
STUDY OF THE PROPAGATION OF WAVES GENERATED BY UNDERWATER EXPLOSIONS M.S. Thesis
Paulo Roberto Gotac May 1982 121 p refs In PORTUGUESE; ENGLISH summary
(INPE-2391-TDL/086) Avail: NTIS HC A06/MF A01

Pressure wave propagation generated by underwater explosions at depths characterized by the lack of available information were studied. Features of the principle of Similarity are examined. Experimental results were obtained from measurements with standard charges of cast TNT and detonated in an acoustic range. Specific impulse, energy flux and first bubble period data showed a departure from data extrapolated for the adopted depth. Spectral analysis was accomplished using the FFT technique and it was seen that maximum of spectral density occurred at the frequency corresponding to the first bubble period. S.L.

N83-10383*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Aerospace and Ocean Engineering.
TURBULENT BOUNDARY LAYER OVER SOLID AND POROUS SURFACES WITH SMALL ROUGHNESS Final Report
Fred Y. Kong, Joseph A. Schetz, and Fayette Collier Sep. 1982 89 p refs
(Grant NAG1-119)
(NASA-CR-3612; NAS 1.26:3612) Avail: NTIS HC A05/MF A01 CSCL 20D

The wind tunnel models and instrumentation used as well as data reduction and error analysis techniques employed are described for an experimental study conducted to measure directly skin friction and obtain profiles of mean velocity, axial and normal turbulence intensity, and Reynolds stress in the untripped boundary

on a large diameter axisymmetric body. Results are given for such a body with a (1) smooth, solid surface; (2) a sandpaper roughened, solid surface; (3) a sintered metal, porous surface; (4) a "smooth" performated titanium surface; (5) a rough, solid surface made of fine diffusion bonded screening; and (6) a rough, porous surface made of the same screening. The roughness values were in low range (k+ 5 to 7) just above what is normally considered "hydraulically smooth". Measurements were taken at several axial locations and tow or normal stream freestream velocities, 45.1 m/sec and 53.5 m/sec. A.R.H.

N83-10384 Illinois Univ., Urbana-Champaign.
THE HYDRODYNAMICS OF ROTATING SUPERFLUIDS Ph.D. Thesis
Elaine Ackles Chandler 1981 111 p
Avail: Univ. Microfilms Order No. DA820342

A coarse grained hydrodynamics is developed. To account for the dynamics of the vortex lattice, the macroscopic vortex displacement field is treated as an independent degree of freedom. The conserved energy is written in terms of the coarse grained normal fluid, superfluid, and vortex velocities and includes an elastic energy associated with deformations of the vortex lattice. Equations of motion consistent with the conservation of energy, entropy and vorticity and containing mutual friction terms arising from microscopic interactions between normal fluid excitations and the vortex lines are derived. The dispersion relation and damping of the first and second sound modes and the two transverse modes sustained by the system are investigated. It is shown that mutual friction mixes the transverse modes of the normal and superfluid components and damps the transverse mode associated with the relative velocity of these components, making the wave evanescent in the plane perpendicular to the rotation axis. Dissert. Abstr.

N83-10385 Michigan Univ., Ann Arbor.
A STUDY OF DROPWISE AND FILM CONDENSATION UNDER VARIABLE GRAVITY FIELDS Ph.D. Thesis
Satyanarayana Kodali 1981 150 p
Avail: Univ. Microfilms Order No. DA8204687

The objective of this study is to improve the understanding of the dropwise condensation mechanism by varying one of the parameters, the drop departure size, by using centrifugal acceleration and to extend the verification of film condensation analysis to higher g's. For film condensation, the analysis of Nusselt provides the theoretical correlation between the condensation heat transfer coefficient and the accelerating field. For dropwise condensation, a correlation was derived for the heat transfer coefficient as a function of the accelerating field based on a known drop size distribution function. Using a force balance method and dimensional analysis, expressions for the relative departure size of a drop under variable gravity fields were determined. A comparison of the data with the theoretical predictions was made. The agreement for film condensation heat transfer coefficients was good over the entire range of measurements. The maximum deviation from the analysis of Nusselt was about 16%. The dropwise condensation theory predicted the heat transfer coefficient to increase directly with the acceleration to the power of 1/6. The measurements agreed closely with this relationship for accelerations up to 400 g's. The measured heat transfer coefficients at 800 g's were lower than those at 400 g's. Dissert. Abstr.

N83-10386 Illinois Univ., Urbana-Champaign.
THE STUDY OF THE EFFECT OF GRAVITY ON NOZZLE FLOWS BY HODOGRAPH TRANSFORMATION Ph.D. Thesis
Philemon Chi-Ting Chan 1981 170 p
Avail: Univ. Microfilms Order No. DA8203421

The effect of gravity on incompressible potential nozzle flows was studied by the method of hodograph transformation coupled with numerical computations. It is learned that the method of hodograph transformation can be successfully applied to problems involving curved channel walls. Calculations were performed for flows discharging from nozzles of different geometries. Results show that the effect of gravity cannot be underestimated before it is fully assessed. One dimensional approximation can also lead to erroneous results. The important information of the variation of the total head (or far upstream pressure) with volumetric discharge rate for different nozzles was obtained. It is also learned that early flow separation along the top channel boundary can occur when the total flow mechanical energy is too small. Thus various flow regimes of gravitational nozzle flows are classified and discussed. Dissert. Abstr.

N83-10387*# Lockheed Missiles and Space Co., Huntsville, Ala. Research and Engineering Center.
EFFECT OF ENCLOSURE SHAPE ON NATURAL CONVECTION VELOCITIES
S. J. Robertson and L. A. Nicholson Sep. 1982 45 p refs
(Contract NASw-3281)
(NASA-CR-169444; NAS 1.26:169444; LMSC-HREC-TR-D784759)
Avail: NTIS HC A03/MF A01 CSCL 20D

A numerical analysis was performed to compare natural convection velocities in two dimensional enclosures of various shape. The following shapes were investigated: circle, square, horizontal and upright 2 x 1 aspect ratio rectangles, horizontal and upright half circles, diamond. In all cases, the length scale in the various dimensionless parameters, such as Rayleigh number, is defined as the diameter of the equal area circle. Natural convection velocities were calculated for Rayleigh numbers of 1000 and 5000 with the temperature difference taken to be across (1) the maximum horizontal dimension, (2) the median horizontal line (line through centroid) and (3) the horizontal distance such that the temperature gradient is the same for shapes of equal area. For the class of shapes including the square, upright half circle and upright rectangle, the computed velocities were found to agree very closely with that of the equal area circle when the temperature difference is taken to be across the maximum horizontal dimension (condition (a)). The velocities for the horizontal rectangle and half circle were found to be approximately one half that of the equal area circle for the same condition. Better overall agreement among all shapes was obtained by setting the temperature difference across a distance such that the temperature gradients were equal for shapes of equal area. Author

N83-10388*# Illinois Inst. of Tech., Chicago. Dept. of Mathematics.
APPLICATION OF THE HUGHES-LIU ALGORITHM TO THE 2-DIMENSIONAL HEAT EQUATION Final Report
David S. Malkus, Peter I. Reichmann, and Raphael T. Haftka (Virginia Polytechnic Inst. and State Univ.) Washington NASA 1982 34 p refs
(Grants NAG1-224; NsG-1266)
(NASA-CR-3599; NAS 1.26:3599) Avail: NTIS HC A03/MF A01 CSCL 20M

An implicit explicit algorithm for the solution of transient problems in structural dynamics is described. The method involved dividing the finite elements into implicit and explicit groups while automatically satisfying the conditions. This algorithm is applied to the solution of the linear, transient, two dimensional heat equation subject to an initial condition derived from the soluton of a steady state problem over an L-shaped region made up of a good conductor and an insulating material. Using the IIT/PRIME computer with virtual memory, a FORTRAN computer program code was developed to make accuracy, stability, and cost comparisons among the fully explicit Euler, the Hughes-Liu, and the fully implicit Crank-Nicholson algorithms. The Hughes-Liu claim that the explicit group governs the stability of the entire region while maintaining the unconditional stability of the implicit group is illustrated. S.L.

N83-10389*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
IMPLICIT MARCHING SOLUTION OF COMPRESSIBLE VISCOUS SUBSONIC FLOW IN PLANAR AND AXISYMMETRIC DUCTS Ph.D. Thesis
Charles E. Towne and Joe D. Hoffman (Purdue Univ., West Lafayette, Ind.) Sep. 1982 222 p refs
(NASA-TM-82876; E-1251; NAS 1.15:82876) Avail: NTIS

HC A10/MF A01 CSCL 20D

A new streamwise marching procedure was developed and coded for compressible viscous subsonic flow in planar or axisymmetric ducts with or without centerbodies. The continuity, streamwise momentum, cross-flow momentum, and energy equations are written in generalized orthogonal curvilinear coordinates. To allow the use of a marching procedure, second derivatives in the streamwise momentum equation are written as the sum of a known two dimensional imposed pressure field and an unknown one dimensional viscous correction. For turbulent flow, the Reynolds stress and heat flux terms are modeled using two-layer eddy viscosity turbulence models. Author

N83-10390# Royal Aircraft Establishment, Farnborough (England).
THE NUMERICAL COMPUTATION OF THREE-DIMENSIONAL TURBULENT BOUNDARY LAYERS
P. D. Smith Apr. 1982 20 p refs Presented at IUTAM Symp. on Three-Dimensional Turbulent Boundary Layers, Berlin, 29-31 Mar. 1982
(RAE-TM-AERO-1945; BR83571) Copyright. Avail: NTIS HC A02/MF A01

The governing equations for compressible three dimensional turbulent boundary layers in a general coordinate system are given. Methods for the solution of these equations and their integral counterparts are compared. Finite difference techniques are reviewed. Integral methods retain their advantages of speed and robustness which make them particularly suitable for viscous-inviscid interaction calculations. The finite difference methods are however not restricted by any velocity profile assumptions and allow more advanced turbulence models to be more readily incorporated. The emergence of inverse methods both integral and finite difference is predicted. Author (ESA)

N83-10391# Royal Aircraft Establishment, Farnborough (England). Aerodynamics Dept.
CALCULATIONS OF ASYMMETRIC SEPARATED FLOW PAST CIRCULAR CONES AT LARGE ANGLES OF INCIDENCE
S. P. Fiddes and J. H. B. Smith Jun. 1982 15 p refs Presented at AGARD/FDP Symp. on Missile Aerodyn., Trondheim, Norway, 20-22 Sep. 1982
(RAE-TM-AERO-1949; BR84101) Avail: NTIS HC A02/MF A01

The results of calculations of the flow over slender circular cones at large angles of incidence are presented. The vortices which form above the cone as a result of boundary layer separation are represented by two inviscid models: as isolated line vortices and as vortex sheets with line vortex cores. For each model, a family of solutions is revealed in which the flow remains asymmetric even when the separation lines are specified to lie symmetrically about the incidence plane. The side force which is predicted by this second family of solutions is very much larger than the side force which can be obtained by specifying asymmetric separation lines in the first family of solutions and corresponds to the maximum side force levels found experimentally. The existence of an essentially inviscid mechanism for the generation of side force at zero yaw is concluded. Author (ESA)

N83-10392# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Mathematical Sciences.
NEW HIGHER-ORDER BOUNDARY-LAYER EQUATIONS FOR LAMINAR AND TURBULENT FLOW PAST AXISYMMETRIC BODIES
C. Kleinstreuer, A. Eglima, and J. E. Flaherty Apr. 1982 37 p refs Submitted for publication
(Grant AF-AFOSR-0192-80; AF Proj. 2304)
(AD-A117806; AFOSR-82-0588TR) Avail: NTIS HC A03/MF A01 CSCL 20/4

New sets of boundary-layer equations accounting for flow field non-uniformities such as curvature effects, normal stress and pressure variations as well as separation, are derived. The boundary-layer flow domain is subdivided into: (1) a parabolic region where the fluid flow is approximately parallel to the submerged body, i.e., $v << u$; and (2) an elliptic region which includes the line of separation where significant interactions between the boundary-layer and the outer potential flow occur, i.e., v approx u. Closure for the turbulent flow equations has to be obtained with submodels for the Reynolds stresses which reflect the effects of boundary-layer thickening as well as separation. The accuracy of the parabolic equations was compared with Van Dyke's higher-order boundary-layer equations for laminar flow past a body with longitudinal curvature. The results demonstrate that the new modeling equations make a measurable difference as expected from observations made by Bradshaw and others. Author (GRA)

N83-10393# Stevens Inst. of Tech., Hoboken, N. J. Dept. of Mechanical Engineering.
RESEARCH ON THE BEHAVIOR OF CASCADED AIRFOILS UNDER CONDITIONS OF HIGH MEAN LOADING AND FLOW UNSTEADINESS Final Technical Report, 15 Sep. 1979 - 31 Jan. 1982
F. Sisto 30 Jun. 1982 49 p refs
(Contract N00014-79-C-0765; NR Proj. 094-391)
(AD-A117543) Avail: NTIS HC A03/MF A01 CSCL 01/3

This contract, transferred to the auspices of the SQUID program effective 1 March 1981, was originally planned as a three year program. The objectives were predominantly experimental in nature: to measure the unsteady velocities in the rotor passage of a single stage axial flow compressor and map the velocity field at operating conditions near rotor blade stall. For this purpose a laser doppler velocimeter was to be developed and married to a new single stage axial flow compressor designed expressly for this purpose. At the premature conclusion of the contract, the first successful velocity determination in the running compressor had not been obtained, although the LDA and its associated subsystem was operational. Some compressor cascade modelling studies, ultimately intended to be guided, or 'calibrated' by the experimental results are only partially completed. Author (GRA)

N83-10394# KMS Fusion, Inc., Ann Arbor, Mich.
PICLE: A 2-D CODE FOR LASER-BEAM - GAS-JET INTERACTION STUDIES M.S. Thesis
M. J. Dunning 1981 82 p refs
(Contract DE-AC08-78DP-40030)
(DE82-007256; KMSF-U-1195) Avail: NTIS HC A05/MF A01

A heat transport hydrodynamic PIC code was adapted for application to the KMSF gas jet experiments. The input material density profile was changed from the original solid slab geometry to a cylindrically symmetric profile modeling the gas jet plume. The target material was changed from the original $Z = 1$ to arbitrary Z. Energy deposition was modified to include inverse bremsstrahlung and resonance absorption. It is indicated that electron thermal conduction dominates over mass flow for times up to about the laser pulse length. Electron thermal conduction varies between classical and flux limited values spatially and temporally according to plasma conditions. Applications of this code, entitled PICIE (Particle In Cell Laser Equipment code), to absorption and flux limit parameter studies are described. DOE

N83-10395# Oak Ridge National Lab., Tenn. Computer Sciences Div.
ONE DIMENSIONAL MULTI-PHASE MOVING BOUNDARY PROBLEMS WITH PHASES OF DIFFERENT DENSITIES
D. G. Wilson Jan. 1982 25 p refs
(Contract W-7405-eng-26)
(DE82-010324; ORNL/CSD-93) Avail: NTIS HC A02/MF A01

Density changes in phase change problems are analyzed. It is customary in analyzing such problems to ignore the bulk movement of material thus introduced and assume the densities to be equal. However, for one dimensional problems the complexity introduced by this bulk movement is more apparent than real. This can be demonstrated by posing the problem in local coordinates fixed in each phase. A one dimensional, multiphase Stefan problem with phases of distinct densities is defined and solved. This explicit solution is essentially a similarity solution in the local coordinates. However, utility of these local coordinates is not limited to problems for which similarity solutions exist. They could be

used with finite element or finite difference schemes to analyze more complex problems. DOE

N83-10396# Sandia Labs., Albuquerque, N. Mex. Computation Physics and Mechanics Div.
WONDY V: A ONE-DIMENSIONAL FINITE-DIFFERENCE WAVE-PROPAGATION CODE
M. E. Kipp and R. J. Lawrence Jun. 1982 222 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019807; SAND-81-0930) Avail: NTIS HC A10/MF A01

WONDY V solves the finite difference analogs to the Lagrangian equations of motion in one spatial dimension (planar, cylindrical, or spherical). Simulations of explosive detonation, energy deposition, plate impact, and dynamic fracture are possible, using a variety of existing material models. In addition, WONDY proves to be a powerful tool in the evaluation of new constitutive models. A preprocessor is available to allocate storage arrays commensurate with problem size, and automatic rezoning may be employed to improve resolution. A description of the equations solved, available material models, operating instructions, and sample problems are given. DOE

N83-10397# Vereinigte Elektrizitaetswerke Westfalen A.G., Dortmund (West Germany).
DETERMINATION OF FRICTION COEFFICIENTS ON SEVERAL DISTANT HEAT PIPE SECTIONS WITH DIFFERENT SLIDING PARTNERS Final Report, Dec. 1980
Rudolf Girnus and Heinz Gerken Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 53 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-095; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

The sticking friction coefficients of supports with different sliding parameters were determined close to operating conditions. Test results on lines in operation with unexpected high sticking friction figures are cited. The sliding partners steel/steel, galvanized steel/steel, and Teflon/steel were studied. The sticking friction values were determined from normal forces, pull force, and displacement measure amplitudes. The results of these tests with steel point to greater values than generally known and refer to values for Teflon/steel bearings. Author (ESA)

N83-10398# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
NOTES ON THE UNSTEADY RECTILINEAR MOTION OF A PERFECT GAS. PART 5: A NONUNIFORMLY TRAVELING SHOCK WAVE IN AN LMS GAS
J. A. Steketee and R. F. vanderDam Oct. 1981 45 p refs
(VTH-LR-328) Avail: NTIS HC A03/MF A01

A relatively simple flow of an LMS gas is considered. The LMS gas is nonhomentropic, but the entropy distribution is chosen in such a way that generalized Riemann invariants r* and s* exist. It is shown that a flow is possible, consisting of two domains, each with r* and s* constant, while the separation between the domains is a normal shock wave that satisfies the Rankine-Hugoniot conditions. The shock wave travels with a variable velocity. Exact solutions of such cases are rare. Author (ESA)

N83-10399# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
NOTES ON THE UNSTEADY RECTILINEAR MOTION OF A PERFECT GAS. PART 6: ON A TRANSFORMATION OF STANIUKOVICH AND ITS GENERALIZATION
J. A. Steketee Feb. 1982 50 p refs
(VTH-LR-329) Avail: NTIS HC A03/MF A01

A transformation which transforms a differential equation for p(h, t) in a homentropic flow into a differential equation for p sub 1 (h sub 1, t) in a flow of a Ludford-Martin-Staniukovich gas is applied to the general theory of transformations of the equations of motion for the unsteady rectilinear flow of a perfect gas. The Staniukovich transformation is generalized, resulting in a three parameter continuous transformation group. The infinitesimal operators of the group are obtained and the invariance of a number of differential equations under the transformation is established. Author (ESA)

N83-10400# National Bureau of Standards, Washington, D.C.
APPLICATION OF THE METHOD OF CHARACTERISTICS TO PREDICT ATTENUATION IN UNSTEADY PARTIALLY FILLED PIPE FLOW
John Swaffield Dec. 1981 90 p refs Prepared in cooperation with Brunel Univ., Uxbridge, England
(Contract HUD-H-48-78)
(PB82-196700; NBSIR-82-2478) Avail: NTIS HC A05/MF A01 CSCL 13M

The mechanism of flow attenuation in partially filled unsteady pipe flow is presented and shown to have relevance to the design of gravity drainage systems. The equations defining unsteady flow in partially filled pipe are derived and shown to be capable of solution by means of the method of characteristics. This technique as a method of predicting flow depth, velocity and wave speed along a long drainage pipe at a range of pipe gradients, diameters, and routhness coefficients was tested by means of numerical examples for a series of simulations run on a digital computer. Additionally, limited experimental verification of the analysis technique is presented for the supercritical flow response to a short duration inflow surge. Generally, the technique developed was found to be applicable to the design of drainage systems and further work is proposed to both extend the experimental verification and for the greater complexity of the multi-branched pipe system. Author

N83-10401# National Bureau of Standards, Washington, D.C.
ECONOMIC EFFICIENCY IN THE SIZING OF RESIDENTIAL HEAT PUMPS Final Report
Joel Levy and Stephen R. Petersen Jul. 1981 75 p refs
(PB82-179029; NBSIR-80-2176) Avail: NTIS HC A04/MF A01 CSCL 13A

A methodology to determine the optimal heat pump size, in terms of heating output capacity, for residential installations having annual heating requirements significantly greater than annual cooling requirements is presented. The optimal size heat pump is defined as the size for which total present value, life cycle heating and cooling costs are minimized. Incremental energy savings from increasing the output capacity of the heat pump are calculated using hourly simulation models of heat pump and building performance. The dollar value of the incremental savings, is calculated and compared with incremental costs to determine the optimal heat pump size. A number of sensitivity analyses are performed to show that effects of changes in load size, degradation coefficients, power utilization efficiency, economic assumptions and geographic location on the optimal heat pump size. GRA

N83-10402# Netherlands Organization for Applied Scientific Research TNO, Delft. Div. of Technology for Society.
TURBULENCE EFFECTS ON HIGH REYNOLDS NUMBER FLOW PAST CIRCULAR CYLINDERS
P. E. J. Vermeulen Apr. 1981 19 p refs Presented at the Symp. Designing with Wind, Nantes, France, 15-19 Jun. 1981
(PB82-176314) Avail: NTIS HC A02/MF A01 CSCL 20D

Results are presented of a wind tunnel study of the interaction between grid generated turbulence and the flow around a rough cylinder. The roughness Reynolds number of the tests varied between Rk - 990 and 1100, so the experimental results can be regarded as approximately Reynolds number independent. The results show a rather complicated relation between the free stream turbulence intensity and the cylinder drag. A general theory is offered for the explanation of these effects. GRA

N83-10403# National Aerospace Lab., Amsterdam (Netherlands).
EVALUATION REPORT: AGARD FLUID DYNAMICS PANEL SYMPOSIUM ON FLUID DYNAMICS OF JETS WITH APPLICATION TO V/STOL
B. M. Spee Jul. 1982 11 p refs

(AGARD-AR-187) Avail: NTIS HC A02/MF/MF A01

Topics covered include: (1) jet interactions with neighboring surfaces; (2) jet structure and development; (3) wind tunnel simulation of flow field, forces moments; (4) injection and thrust augmentation; (5) theoretical models and their assessments; (6) two dimensional wall jets; and (7) the use of a tracer gas method for measuring entrainment of an axisymmetric free jet. Conclusions of a panel on the impact of military applications on rotorcraft and V/STOL aircraft design are summarized. A.R.H.

N83-10228# Pacifica Technology, San Diego, Calif.
AN EVALUATION OF: DOUBLY ASYMPTOTIC APPROXIMATION; STAGGERED SOLUTION SCHEMES; USA-STAGS
R. S. Dunham, R. J. James, A. S. Kushner, and D. E. Ranta *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 133-172 (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/4

N83-10012# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
NUMERICAL TESTS OF THREE-DIMENSIONAL FLOW IN A TRANSONIC TURBINE
Yaoke Zhang, Zengjin Gong, and Mengyu Shen *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 101-116 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 16 p Original language document announced as A82-22118 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

35 INSTRUMENTATION AND PHOTOGRAPHY

Includes remote sensors; measuring instruments and gages; detectors; cameras and photographic supplies; and holography.

For aerial photography see *43 Earth Resources.* For related information see also *06 Aircraft Instrumentation,* and *19 Spacecraft Instrumentation.*

N83-10404*# Hughes Research Labs., Malibu, Calif.
ROTATING GRAVITY GRADIOMETER STUDY Final Report, 1 May 1981 - 30 Apr. 1982
Robert L. Forward 30 Apr. 1982 55 p refs
(Contract NASw-3514)
(NASA-CR-169440; NAS 1.26:169440) Avail: NTIS HC A04/MF A01 CSCL 14B

Two rotating gravity gradiometer (RGG) sensors, along with all the external electronics needed to operate them, and the fixtures and special test equipment needed to fill and align the bearings, were assembled in a laboratory, and inspected. The thermal noise threshold of the RGG can be lowered by replacing a damping resistor in the first stage electronics by an active artificial resistor that generates less random voltage noise per unit bandwidth than the Johnson noise from the resistor it replaces. The artificial resistor circuit consists of an operational amplifier, three resistors, and a small DC to DC floating power supply. These are small enough to be retrofitted to the present circuit boards inside the RGG rotor in place of the 3 Megohm resistor. Using the artificial resistor, the thermal noise of the RGG-2 sensor can be lowered from 0.3 Eotvos to 0.15 Eotvos for a 10 sec integration time. S.L.

N83-10405# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
HIGH RESOLUTION, BROAD SPECTRAL BAND RADIOMETER M.S. Thesis [RADIOMETRO DE ALTA RESOLUCAO DE AMPLA FAIXA EXPECTRAL]
Amauri Silva Montes Jul. 1982 108 p refs
(INPE-2460-TDL/096) Avail: NTIS HC A06/MF A01

The development and the construction of a radiometric equipment of high spatial resolution are presented. This equipment is constituted by a telescope with collimated beam, analogous to the cassegrain, by a system of pyroelectric detection and by a unity of electronical process. All the details of its construction, optical alignment of its components, calibration and confiability test are shown. The spectral range is from 1,8 um to 22 um. An experiment with stratospheric baloon at an altitude of about 35 km was carried out. The radiometer measured the flux of radiation emitted by the terrestrial surface and by the atmosphere to space. Data received at ground are interpreted within a proposed mode to the system. Conclusions about reflectances, local albedo and radiant temperature for this system are reached. The coherent results have demonstrated the good performance of the instrument. The transformation of the radiometer into a high spatial resolution spectroradiometer is suggested. Author

N83-10406 California Inst. of Tech., Pasadena.
UNSTEADY 2-PHASE FLOW INSTRUMENTATION AND MEASUREMENT Ph.D. Thesis
Robert J. Bernier 1982 173 p
Avail: Univ. Microfilms Order No. DA8203351

The performance of a transverse field electromagnetic flowmeter in a steady two phase flow was investigated analytically for a disperse and an annular flow regime. The flowmeter output voltage was found to be proportional to the mean velocity of the liquid phase. Experiments in a steady air water mixture showed good agreement with the analysis. An impedance void fraction meter was designed and built to conduct measurements of unsteady void fractions. Short electrodes excited by voltages of opposite polarity were used in combination with a highly sensitive signal processor. The steady state calibration indicated that the meter was somewhat sensitive to the void fraction distribution for the bubbly flow regime. However, the transition to a churn turbulent regime greatly affected the meer steady state response. The dynamic capability of the void fraction meter was estimated by comparison of the statistical properties of the voltage fluctuations in a nominally steady bubbly flow with those of a shot noise process. Dissert. Abstr.

N83-10407*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CHARACTERIZATION OF PARTICLES IN THE LANGLEY 0.3 METER TRANSONIC CRYOGENIC TUNNEL USING HOT WIRE ANEMOMETRY
Jag J. Singh, Charles G. Marple, and William T. Davis Sep. 1982 19 p refs
(NASA-TM-84551; NAS 1.15:84551) Avail: NTIS HC A02/MF A01 CSCL 14B

Hot wire anemometry was used to identify the nature of particles reportedly observed during free stream velocity measurements in the Langley 0.3-meter transonic cryogenic tunnel using a Laser Doppler Velocimeter. Since the heat-transfer process from the hot wire depends on the thermal conductivity and sticking capability of the particles, it was anticipated that the hot wire anemometer response would be affected differently upon impaction by liquid droplets and solid aerosols in the test gas stream. Based on the measured time response of the hot-wire anemometer in the cryogenic tunnel operated in the 0.3-0.8 Mach number range, it is concluded that the particles impacting the hot wire are liquid in nature rather than solid aerosols. It is further surmised that the liquid aerosols are unevaporated liquid nitrogen droplets used for cooling the tunnel test gas. Author

N83-10408# Oregon Univ., Eugene. Inst. of Theoretical Science.
SYNCHROTRON RADIATION TO BE USED TO GENERATE HOLOGRAPHIC X-RAY GRATINGS
Paul L. Csonka (Stanford Univ., Calif.) and Roman Tatchya 1981 5 p refs
(Contract DE-AT06-76ER-70004)
(DE82-008354; DOE/ER-70004/302) Avail: NTIS HC A02/MF A01

The synchrotron radiation generated by high electrons circulating in storage rings may be used to produce holographic X-ray

gratings of up to about 5 x 10(4) lines per millimeter. Such gratings could then be employed as elements in X-ray optics. They could also serve to test recording resoluton of various surfaces, to study narrow strips of monolayers, to investigate Block oscillations, or to observe the fine structure of Landau levels as well as in the construction of artificial crystals. DOE

N83-10409# Sandia Labs., Albuquerque, N. Mex. Applied Mathematics Div.

ION-TRAJECTORY SIMULATIONS FOR A PROPOSED TIME-OF-FLIGHT MASS SPECTROMETER

B. M. Marder and G. W. McClure May 1982 32 p refs

(Contract DE-AC04-76DP-00789)

(DE82-015493; SAND-81-0433) Avail: NTIS HC A03/MF A01

Intense focused ion beams are developed to achieve inertial confinement fusion. A time of flight mass spectrometer will be used to determine the ion composition of the beam. The design of this device is aided by computer simulations which give the ion trajectories. DOE

N83-10410# Kalle, Wiesbaden (West Germany).

MAGNETOOPTICAL LIGHT SWITCHES IN ELECTROPHOTOGRAPHIC PRINTERS Final Report, Apr. 1981

Detlef Winkelmann and Peter Riedel Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 51 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-092; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 10,50

A high definition, high speed reproduction (copying) system, based on the use of semiconductors instead of mechanical or optical systems, was studied. A combination of Kerr magnetooptical light modulators and organic photoconductors was considered. Tests point out the type of light source, the light intensity, the dimensions of the magnetooptical modulators, the electronic regulator systems, and the type of microprocessor used for modulating light switch. The charge decay time in the tested protoconductors is too long, reducing speed of operation.Further tests used selenium drums instead of the garnet photoconductors. Information is given on how a text system can be adapted to magnetooptical light switches. Author (ESA)

N83-10411# Wisconsin Univ., Madison. Instrumentation Systems Center.

DEVELOPMENT OF EGYPTIAN INSTRUMENTATION TECHNOLOGY Final Report

N. E. Huston and E. D. Falk 1981 279 p refs

(Grant NSF INT-79-11051)

(PB82-199845) Avail: NTIS HC A13/MF A01 CSCL 14B

During early 1977, USAID/CAIRO engaged Dor. Huston and two UW/ISC staff members, Mr. Weckel and Mr. Falk, as consultants. The purpose of this engagement was to prepare technical specifications and submit procurement plans for scientific instruments, apparatus, and equipment required for the National Research Center in Cairo. More than 2 man months were spent in Cairo and 2 man months in Wisconsin in performing these tasks. Mr. Falk made 2 additional trips to Cairo in August 1977 and December 1978 in performing work ancillary to the earlier assignments. The outcome of this engagement was the initiation of procurement for about two million dollars worth of equipment. In the course of these interactions a detailed familiarity was obtained with the NRC and SIC facilities and a close rapport was established with the Egyptian managers, scientists and engineers associated with them. Another program detailing with the development of maintenance and repair programs within the Egyptian scientific community was undertaken under NSF sponsorship in 1978. L.F.M.

N83-10412# Arkansas Univ., Little Rock.

IN-SITU AERODYNAMIC SIZING OF AEROSOL PARTICLES WITH THE SPART ANALYZER Final Report, Jun. 1976 - Feb. 1980

Malay K. Mazumder, R. E. Ware, J. D. Wilson, R. G. Renninger, P. C. McLeod, and R. A. Sims Apr. 1982 47 p refs

(Contract EPA-R-804429)

(PB82-197195; EPA-600/3-82-009) Avail: NTIS HC A03/MF A01 CSCL 14B

A single particle aerodynamic relaxation time (SPART) analyzer was developed to measure the aerodynamic size distribution of aerosol particulates in the range 0.1 to 10.0 micrometers in diameter. The analyzer sizes and counts individual suspended particles and droplets from sampled aerosols, determines their aerodynamic diameter, and generates the size distribution in real time. The measurement is independent of the electrical and optical properties of the particles. The size range and resolution of the SPART analyzer depends on the acoustic frequency. Operating at 27 kHz, the instrument's effective sampling rate was calibrated in the range of 0.3 to 6.0 micrometers using test aerosols containing monodisperse polystyrene latex spheres and olive oil droplets. The instrument can count and size aerosol particulates at a maximum rate of 200 particles per second. The sensing volume of the instrument is approximately .00001 cc, which allows the size distribution measurement of an aerosol containing a relatively high particulate concentration without an appreciable coincidence loss. GRA

N83-10413# Cincinnati Univ., Ohio. Computing Center.

THE STANDARD CALIBRATION INSTRUMENT AUTOMATION SYSTEM FOR THE ATOMIC ABSORPTION SPECTROPHOTOMETER. PART 3: PROGRAM DOCUMENTATION

Dennis P. Ryan and Gregory S. Roth Apr. 1982 243 p refs

(Contract GS-05S-10458)

(PB82-187857; EPA-600/4-82-017C-Pt-3) Avail: NTIS HC A11/MF A01 CSCL 14B

Complete documentation of the 15 programs and 11 data files of the EPA Atomic Absorption Instrument Automation System is presented. The system incorporates the following major features: (1) multipoint calibration using first, second, or third degree regression or linear interpolation, (2) timely quality control assessments for spiked samples, duplicates, laboratory control standards, reagent blanks, and instrument check standards, (3) reagent blank subtraction, and (4) plotting of calibration curves and raw data peaks. The programs of this system are written in Data General Extended BASIC, Revision 4.3, as enhanced for multi-user, real-time data acquisition. They run in a Data General Nova 840 minicomputer under the operating system RDOS, Revision 6.2. There is a functional description, a symbol definitions table, a functional flowchart, a program listing, and a symbol cross reference table for each program. The structure of every data file is also detailed. Author

N83-10414# Cincinnati Univ., Ohio. Computing Center.

THE STANDARD CALIBRATION INSTRUMENT AUTOMATION SYSTEM FOR THE ATOMIC ABSORPTION SPECTROPHOTOMETER. PART 2: USER'S GUIDE

Apr. 1982 87 p refs

(Contract EPA-GS-05S-01458)

(PB82-187840; EPA-600/4 82-017B-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 14B

The user's guide to the atomic absorption instrument automation system is presented. This system receives lists of samples from the sample file control system and returns the measured concentrations to that system. It is capable of interfacing with a number of commercially available atomic absorption instruments. It incorporates the following major features: (1) multipoint calibration using first, second, or third degree regression or linear interpolation, (2) timely quality control assessments for spiked samples, duplicates, laboratory control standards, reagent blanks and instrument check standards, (3) reagent blank subtraction, and (4) plotting of calibration curves and raw data peaks. The programs of this system are written in data general extended BASIC, as enhanced for multiuser, real time data acquisition. They run in a data general Nova 840 minicomputer under the operating system RDOS. Detailed descriptions and examples of the features of the system are presented as they appear to the user. GRA

N83-10415# Cincinnati Univ., Ohio. Computing Center.
THE STANDARD CALIBRATION INSTRUMENT AUTOMATION SYSTEM FOR THE ATOMIC ABSORPTION SPECTROPHOTOMETER. PART 1: FUNCTIONAL SPECIFICATIONS
Dennis P. Ryan Apr. 1982 57 p refs
(Contract EPA-GS-05S-10458)
(PB81-187832; EPA-600/4-82-017A-Pt-1) Avail: NTIS HC A04/MF A01 CSCL 14B

The automation of flameless atomic absorption (AA) spectrophotometers is discussed. It is a real time data acquisition system with on line data reduction, quality control and report generation. The system will automate single or double beam instruments, with or without background correction, and with or without automated sample changers. The data reduction mode of calculation will be method of standard calibrations. Sample backlogs from the SFC processor are accessed by the instrument programs for run initialization. Finished data from the instrument program are approved and transferred to the SFC data base. GRA

N83-10416# National Bureau of Standards, Washington, D.C.
A MEASUREMENT METHOD FOR DETERMINING THE OPTICAL AND ELECTRO-OPTICAL PROPERTIES OF A THIN FILM
Donald R. Larson Dec. 1981 65 p refs
(PB82-177981; NBSIR-81-1652) Avail: NTIS HC A04/MF A01 CSCL 14B

A method of determining the complex refractive index of a thin film on a nonabsorbing substrate is developed. The optical transmittance spectrum of the structure is measured and the index is determined by matching this spectrum numerically. An iterative procedure for finding the magnitude of an induced change in refractive index is also presented. In nonabsorbing spectral regions, the index and film thickness are determined directly. The optical transmittance of sapphire and thin films of gold and epitaxial silicon, both on sapphire, is examined. The refractive index of epitaxial silicon on sapphire, SOS, is determined and compares favorably with the results of other investigators. The measurement method is applied to a thin film of hydrogenated amorphous silicon, a-Si:H, deposited by a capacitively coupled RF glow discharge. The index is tabulated for various wavelengths and a field induced change in index comparable to GaAs is measured. Author (GRA)

N83-10237# Army Engineer Waterways Experiment Station, Vicksburg, Miss.
DEVELOPMENT OF A MULTIAXIAL FORCE-PULSE GENERATOR
R. D. Crowson, F. B. Safford (Agbabian Associates), W. J. Schuman, Jr. (Army Ballistic Research Lab.), and R. Freiberg (Army Electronic Research Development Command) *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 59-68 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/2

36 LASERS AND MASERS

Includes parametric amplifiers.

N83-10417* National Aeronautics and Space Administration. Pasadena Office, Calif.
METHOD AND APPARATUS FOR CONVECTION CONTROL OF METALLIC HALIDE VAPOR DENSITY IN A METALLIC HALIDE LASER Patent
Thomas J. Pivirotto, inventor (to NASA) (JPL, California Inst. of Tech., Pasadena) Issued 14 Mar. 1980 8 p Filed 14 Mar. 1980 Supersedes N80-20574 (18 - 11, p 1421) Sponsored by NASA
(NASA-Case-NPO-15021-1; US-Patent-4,347,613; US-Patent-Appl-SN-130496; US-Patent-Class-372-56; US-Patent-Class-372-59; US-Patent-Class-372-60) Avail: US Patent and Trademark Office CSCL 20E

An apparatus is disclosed in which a reservoir containing copper chloride is heated so that the copper chloride is maintained in a liquid form. The apparatus includes a means for flowing a buffer gas (which in the exemplary embodiment is neon) over the liquid copper chloride to provide a mixture of copper chloride vapor and neon above the liquid copper chloride. A conduit provides fluid communication between the reservoir containing the copper chloride vapor/neon mixture and the laser. The copper chloride vapor density in the laser is related to the liquid copper chloride temperature and the neon flow rate through the reservoir. In accordance with a further feature of the exemplary embodiment, neon is also provided directly to the laser in order to provide a further means of controlling the copper chloride vapor density in the laser.Official Gazette of the U.S. Patent and Trademark Office

N83-10418 Illinois Univ., Urbana-Champaign.
LASER ANNEALING OF ION IMPLANTED SILICON Ph.D. Thesis
Anjan Bhattacharyya 1981 95 p
Avail: Univ. Microfilms Order No. DA8203405

A detailed theoretical and experimental investigation of the dynamics of surface melting and regrowth and electrical activation of Si+ and BF2+ ion implanted amorphized silicon annealed with a Q-switched Nd:glass laser is presented. In the theoretical calculations the technique of finite difference equations was used to solve the one-dimensional heat conduction equations for the solid and liquid phases. The temperature dependence of all the parameters involved was taken into account to give us a realistic model. The melting model is supported by time resolved reflectivity measurements using a He-Ne and an Ar laser. A calculation of the temperature rise is presented and the 'thermal runaway' phenomenon during pulsed CO2 laser annealing of silicon is investigated. The calculations are based on the thermal melting model, taking into account the emperature dependence of all pertinent material parameters, including the absorption coefficient. In calculating the temperature variation of free carrier absorption in n-Si, we have taken into account acoustic deformation potential scattering, optical deformation potential scattering, and ionized impurity scattering. The deformation potentials are adjusted to fit the experimentally observed values at 300 K. Dissert. Abstr.

N83-10419 Illinois Univ., Urbana-Champaign.
DYNAMIC CHARACTERISTICS OF ALUMINUM GALLIUM ARSENIDE-GALLIUM ARSENIDE CONVENTIONAL AND QUANTUM WELL DOUBLE HETEROSTRUCTURE LASER DIODES Ph.D. Thesis
Eric Rune Anderson 1981 86 p
Avail: Univ. Microfilms Order No. DA820339

The dynamic characteristics of AlxGa1-xAs-GaAs conventional quantum-well double-heterostructure laser diodes were investigated. Spontaneous carrier lifetimes of 2.0 to 2.5 nanoseconds were determined for conventional double-heterostructure laser diodes grown by metalorganic chemical vapor deposition (MO-CVD). Photon lifetimes also were determined. Transient and noise measurements were made on AlxGal-xAs-GaAs single- and multiple-quantum-well double-heterostructure laser diodes grown by metalorganic chemical vapor deposition (MO-CVD). Active mode locking was performed on standard proton-bombarded strip AlxGal-xAs-GaAs double-heterostructure laser diodes grown by liquid phase epitaxy. Dissert. Abstr.

N83-10420*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A BLACKBODY RADIATION-PUMPED CO2 LASER EXPERIMENT
Walter H. Christiansen (Washington Univ., Seattle), R. J. Insuik (Washington Univ., Seattle), and Russell J. DeYoung Sep. 1982 14 p refs
(NASA-TM-84541; NAS 1.15:84541) Avail: NTIS HC A02/MF A01 CSCL 20E

Thermal radiation from a high temperature oven was used as an optical pump to achieve lasing from CO2 mixtures. Laser output as a function of blackbody temperature and gas conditions is described. This achievement represents the first blackbody cavity pumped laser and has potential for solar pumping. S.L.

N83-10421# Los Alamos Scientific Lab., N. Mex.
DYE-LASER DEVELOPMENT FOR PLASMA MAGNETIC-FIELD DIAGNOSTIC
Paul G. Weber May 1982 5 p refs
(Contract W-7405-eng-36)
(DE82-016421; LA-9338-MS) Avail: NTIS HC A02/MF A01

A flash-lamp-pumped dye laser has been constructed and operated in DCM dye, yielding outouts greater than 400 W for 100 microns in broadband operation. Attempts to tune this laser by injection locking to a narrow-band CW laser poor efficiency and relatively short locked operation. DOE

N83-10422# Stuttgart Univ. (West Germany). Inst. fuer Plasmaforschung.
CRITERIA FOR AN OPTIMUM LASER DETECTOR SYSTEM FOR THOMSON SCATTERING EXPERIMENTS ON FUSION PLASMAS
K. Hirsch May 1982 30 p refs In GERMAN; ENGLISH summary
(IPF-82-4) Avail: NTIS HC A03MF A01

Different laser systems (Excimer, ruby, neodymium-glass, neodymium-Yag, and CO2 laser) and their accompanying detection system were compared in order to derive optimization criteria. Three boundary cases (number of scattered photons, plasma radiation or detector noise dominates) in which detector, background, or signal noise dominated the detection of scattered light, were treated. For the transition domains, a detailed study of each case is required. For the three boundary cases, optimization criteria are derived on the basis of analytical results. If scattered photons (signal noise) dominates the signal to noise ratio, systems with large wavelength are preferable, as well as if plasma radiation dominates. If detector noise dominates, a lower noise detection system is preferable. Author (ESA)

37 MECHANICAL ENGINEERING

Includes auxiliary systems (non-power); machine elements and processes; and mechanical equipment.

N83-10423 Michigan Univ., Ann Arbor.
AIR MOTION IN A TWO STROKE DIESEL ENGINE CYLINDER Ph.D. Thesis
Nak Won Sung 1981 113 p
Avail: Univ. Microfilms Order No. DA8204769

Air motion in one cyclinder of a Detroit Diesel 6V-92 two stroke diesel engine was studied under steady flow conditions. A laser Doppler velocimeter was used for measurements of axial and tangential velocity components and their turbulent intensities under bench test conditions. Two numerical fluid dynamic models were developed for the analytical study; one a Discrete Vortex Method for inlet jet flow and the other a finite difference method for internal flow. The effects of four different exhaust opening geometries on internal flow were studied by the laser Doppler velocimeter measurements and the finite difference method model. The effects of two different inlet port angles were studied by the finite difference method model. Measurements and calculations confirmed the effects of cylinder inlet and exhaust geometries on internal flow. The swirl induced by the 18 angled inlet ports was found to produce non-uniform axail velocity profiles. Dissert. Abstr.

N83-10424*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
VARIABLE RELUCTANCE PROXIMITY SENSORS FOR CRYOGENIC VALVE POSITION INDICATION
R. A. Cloyd Jul. 1982 50 p refs
(NASA-TM-82493; NAS 1.15:82493) Avail: NTIS HC A03/MF A01 CSCL 13I

A test was conducted to determine the performance of a variable reluctance proximity sensor system when installed in a space shuttle external tank vent/relief valve. The sensors were used as position indicators. The valve and sensors were cycled through a series of thermal transients; while the valve was being opened and closed pneumatically, the sensor's performance was being monitored. During these thermal transients, the vent valve was cooled ten times by liquid nitrogen and two times by liquid hydrogen. It was concluded that the sensors were acceptable replacements for the existing mechanical switches. However, the sensors need a mechanical override for the target similar to what is presently used with the mechanical switches. This override could insure contact between sensor and target and eliminate any problems of actuation gap growth caused by thermal gradients. M.G.

N83-10425*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LIFE AND RELIABILITY MODELS FOR HELICOPTER TRANSMISSIONS
Michael Savage (Akron Univ., Ohio), Raymond James Knorr (Akron Univ., Ohio), and John J. Coy 1982 14 p refs Proposed for presentation at the Rotary Wing Propulsion System Specialist Meeting, Williamsburg, Va., 16-18 Nov. 1982; sponsored by the American Helicopter Society Prepared in cooperation with Army Aviation Research and Development Command, Cleveland
(NASA-TM-82976; E-1405; NAS 1.15:82976; AHS-RWP-16; AVRADCOM-TR-82-C-15) Avail: NTIS HC A02/MF A01 CSCL 01C

Computer models of life and reliability are presented for planetary gear trains with a fixed ring gear, input applied to the sun gear, and output taken from the planet arm. For this transmission the input and output shafts are co-axial and the input and output torques are assumed to be coaxial with these shafts. Thrust and side loading are neglected. The reliability model is based on the Weibull distributions of the individual reliabilities of the in transmission components. The system model is also a Weibull distribution. The load versus life model for the system is a power relationship as the models for the individual components. The load-life exponent and basic dynamic capacity are developed as functions of the components capacities. The models are used to compare three and four planet, 150 kW (200 hp), 5:1 reduction transmissions with 1500 rpm input speed to illustrate their use. A.R.H.

N83-10426# Engineering Development Establishment, Maribyrnong (Australia).
INVESTIGATION OF THE PERFORMANCE OF A FORD 4.1 L 6 CYLINDER SI ENGINE OPERATING ON METHONOL ISO-BUTANOL GASOLINE FUEL BLENDS
D. J. Ayers 1982 24 p refs
(AD-A117746; EDE-10/82; AR002777) Avail: NTIS HC A02/MF A01 CSCL 21/4

A laboratory investigation into the relative performance of a Ford Falcon 4.1 L 6 cylinder in line engine when operated on both super grade gasoline and blends of non leaded gasoline, methanol and iso butanol showed that the engine operated satisfactorily on fuel blends containing up to 30% total alcohol. For the blends thermal efficiency of the engine for most conditions was improved but some torque loss was experienced under full throttle conditions especially at lower engine speeds. This loss increased with increasing proportion of alcohols in the fuel. Author (GRA)

N83-10427# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
HEAVY-DUTY HYDRAULIC STAMPING PRESS WITH STRESSED REINFORCED CONCRETE FRAME
Yu. P. Kuzko, G. A. Prizhbilyak, S. B. Ryslavskiy, N. I. Gorchilin, N. V. Frolov, Ye. M. Lankau, L. I. Dank, F. G. Oseledko, Ye. S. Parshin, and A. P. Kudryaztseva 7 Jun. 1982 5 p Transl. into ENGLISH of Russian Patent no. 126744 (12 Jun. 1959) p 1-3
(AD-A117470; FTD-ID(RS)T-0566-82) Avail: NTIS HC A02/MF A01 CSCL 13/9

Heavy duty hydraulic stamping press with stressed reinforced concrete frame is described. Materials, production methods, construction process, and its feasibility are discussed. GRA

N83-10428# Ruhrkohle A.G., Essen (West Germany).
DEVELOPMENT, CONSTRUCTION, AND EXPERIMENTAL OPERATION OF AN IMPROVED CHAINLESS HAULAGE SYSTEM FOR DRUM-SHEARER LOADERS Final Report, Dec. 1980
Klaus Brinken and Karl-Heinz Klimek Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 23 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-102; ISSN-0340-7608; RAG-317) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 4,50

A model of a chainless hauling system was studied. Many defects were found when operating under severe working conditions. Further development tried to overcome these weaknesses so that a modified system could improve production and viability. The new Rackatrack II system underwent successfully basic investigations. Subsequent underground testing took place. Run-out of the shearer-loader as a result of the cutting force action, wear and deformation of the pin-rack guides, and cleaning problems on the machine guides and the pin racks occured during operation. Since the problems which arose revealed basic problems of the system and its design principles, it is not deemed useful to pursue this project. Author (ESA)

N83-10429# Trochoid Power Corp., Eden Prairie, Minn.
POSITIVE DISPLACEMENT ROTARY VAPOR COMPRESSOR FOR VAPOR COMPRESSION Annual Report, Jan. 1981 - Jan. 1982
R. H. Roche and P. B. Stielstra Feb. 1982 26 p
(Contract GRI-5080-342-0389)
(PB82-227620; GRI-80/0134) Avail: NTIS HC A03/MF A01 CSCL 13G

Economic savings are realized by the use of mechanical vapor compression heat pumps to upgrade waste steam to process-useful temperatures. Engineering, design and manufacturing were completed on an advanced positive displacement rotary vapor compressor. Significant features of this proof of concept compressor are its epitrochoidal design, its ability to achieve high compression ratios, high speed valves, and pressurized lubrication and temperature-conditioning systems. A compressor test facility was built incorporating a variable speed drive and a steam supply system capable of subatmospheric inlet pressures. GRA

N83-10430# Wayne State Univ., Detroit, Mich. Center for Automotive Research.
SENSITIVITIES OF INTERNAL COMBUSTION AUTOMOTIVE ENGINES TO VARIATIONS IN FUEL PROPERTIES Final Report, Apr. - Dec. 1981
N. A. Henein Washington, D.C. DOT Feb. 1982 236 p refs
(Contract DTRS-57-80-P-80733)
(PB82-194961; DOT-TSC-RSPA-81-13) Avail: NTIS HC A11/MF A01 CSCL 21E

The sensitivity of automotive gasoline and diesel engines to variations in fuel properties was assessed. The variables studied include H/C ratio, distillation range, aromatic content, ignition quality as determined by the octane number, and the autoignition quality as determined by the cetane number. The sensitivity of the engine is 'measured' against its power output, fuel economy, emissions, and degradation of lubricants. The sensitivity to the use of alternate fuels such as neat fuels or fuel extenders is discussed. The alternate fuels studied include shale oil derivatives, coal liquefaction derivatives, and alcohols. The impact of using emergency fuels in automotive gasoline and diesel engines is discussed. GRA

N83-10257# Tennessee Technological Univ., Cookeville. Dept. of Mechanical Engineering.
CRITICAL SPEEDS OF MULTI-THROW CRANKSHAFTS USING SPATIAL LINE ELEMENT METHOD
Cemil Bagci and Donald R. Falconer *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 25-42 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 13/9

38 QUALITY ASSURANCE AND RELIABILITY

Includes product sampling procedures and techniques; and quality control.

N83-10431# British Library Lending Div., Boston Spa (England).
HIGH-FREQUENCY ULTRASONICS: NON-DESTRUCTIVE ANALYSIS OF MATERIAL STRUCTURES
K. Goebbels, H. Kapitz, S. Kraus, H. Reiter, E. Schneider, and W. Zimmerman 9 Sep. 1982 65 p refs Transl. into ENGLISH from FhG Ber. (West Germany), no. 3, 1978 p 28-48
(BLL-Risley-TR-4166f-(9091.9F)) Copyright. Avail: British Library Lending Div., Boston Spa, Engl.

Ultrasonic inspection of coarse-grained materials is adversely affected by the scatter signals accompanying the information signals (grass, grain-structure noise). These interference signals (superimposed echoes from grain boundaries) are coherent with the information signals (reflections at defects). Methods of signal processing which take account of the formation of interference signals (ultrasonic scatter) and the associated mathematical interrelationships, permit the detection of information signals, which are lost in the noise under normal ultrasonic inspection condition, frequency, direction averaging). It has been shown that using these methods, defects can not only be detected but also evaluated.
S.L.

N83-10432# AEG-Telefunken, Wedel (West Germany). Fachbereich neue Technologien, Raumfahrt.
RELIABILITY AND SAFETY OF POWER SYSTEMS Final Report, Aug. 1981
Guenter Heiner, Hans-Dieter Kochs, Sieghard Schmidt, and Guenther Brauner Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 207 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-080; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 37

Results achieved on the reliability and safety of power systems are documented. Approaches to reliability and safety analysis were investigated and compared with regard to their applicability. On the basis of these investigations, two computer programs were developed. A cut set program calculates the availability of complex systems consisting of statistically independent components. Another program evaluates all the reliability indices characteristizing the stationary behavior of homogeneous Markov processes. The second subproject is devoted to reliability modeling of control system features. Special concern is given to the discrimination of failure modes (component or bus failure, computer shutdown) and maintenance modes (single component maintenance, computer test). Methods for reliability evaluation are applied to concrete examples. The third subproject is concerned with transmission reliability calculation in relation to the reliability of protective relays. Appropriate methods are worked out and applied to a busbar protective system. Author (ESA)

N83-10219# Defense Industrial Supply Center, Philadelphia, Pa.
DEPARTMENT OF DEFENSE POLICY ON RELIABILITY AND MAINTAINABILITY
Ben H. Swett *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 37-46 (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 14/4

39 STRUCTURAL MECHANICS

Includes structural element design and weight analysis; fatigue; and thermal stress.

For applications see *05 Aircraft Design, Testing and Performance* and *18 Spacecraft Design, Testing and Performance.*

N83-10433# Shock and Vibration Information Center (Defense), Washington, D. C.
THE SHOCK AND VIBRATION DIGEST, VOLUME 14, NO. 8 Monthly Report
Judith Nagle-Eshleman, ed. Aug. 1982 122 p refs
(AD-A119004) Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Structural noise transmission is reviewed. Noise transmission into aircraft is discussed. Nonlinear analysis of beams is surveyed. For individual titles, see N83-10434 through N83-10436.

N83-10434# Massachusetts Inst. of Tech., Cambridge. Dept. of Mechanical Engineering.
A REVIEW OF STRUCTURAL NOISE TRANSMISSION
R. H. Lyon and J. W. Slack *In* Shock and Vibration Information Center The Shock and Vibration Dig., Vol. 14, No. 8 Aug. 1982 p 3-12 refs (For primary document see N83-10433 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20A

Theoretical and experimental analyses of noise transmission in structures are characterized. The transmission path and vibratory response are discussed, as are the uses of broadband transfer functions to estimate time-varying response and of signal processing to diagnose vibration sources and paths. Author

N83-10435# Columbia Univ., New York. Inst. of Flight Structures.
RECENT RESEARCH ON NOISE TRANSMISSION INTO AIRCRAFT **c71**
R. Vaicaitis *In* Shock and Vibration Information Center The Shock and Vibration Dig., Vol. 14, No. 8 Aug. 1982 p 13-18 refs (For primary document see N83-10433 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

Noise transmission prediction into aircraft is surveyed. Noise transmission and cabin noise optimization for a propeller driven aircraft are considered. Author

N83-10436# Clarkson Coll. of Technology, Potsdam, N.Y.
NONLINEAR ANALYSIS OF BEAMS. PART 1: A SURVEY OF RECENT ADVANCES
M. Sathyamoorthy *In* Shock and Vibration Information Center The Shock and Vibration Dig., Vol. 14, No. 8 Aug. 1982 p 19-35 refs (For primary document see N83-10433 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/11

Nonlinear analyses of beams were surveyed. Geometric, material, and other types of nonlinearities are considered. Classical nonlinear methods are finite element techniques are reviewed. Author

N83-10437 Maryland Univ., College Park.
GLOBAL ANALYSIS OF PROBLEMS FROM NONLINEAR THERMOELASTICITY Ph.D. Thesis
Roger Charles Gauss 1981 183 p
Avail: Univ. Microfilms Order No. DA8205226

The global qualitative behavior of buckled states of nonlinearly thermoelastic rods and circular plates, subject to uniform thermal loading on their boundary is examined. In contrast to the models previously considered, the equations used here furnish a geometrically exact description of the deformation of insulated nonuniform rods and plates, which allows for a very general nonlinear response. The nonuniformity may be due to variations in thickness along the rod or plate and/or to nonhomogeneity of the constitutive variables. A two temperature theory is developed, and for the rod theory, boundary conditions which generate a two parameter problem are considered. The global bifurcation theory is adapted to show that large solutions preserve the nodal structure from the eigenfunctions of the problems linearized about the trivial solution. It is shown that the nature of the shear response is critical in determining the spectral behavior. Dissert. Abstr.

N83-10438 Maryland Univ., College Park.
STUDY OF ENERGY LOSS DURING A FRACTURE EVENT Ph.D. Thesis
Arun Shukla 1981 189 p
Avail: Univ. Microfilms Order No. DA8205268

The crack tip fracture energy and the energy loss away from the crack tip during run arrest fracturing was investigated. Specimens used were fabricated from a brittle polyester, Homalite 100, and 4340 steel. Two different kinds of experiments were utilized to evaluate the energy loss at and away from the crack tip. The first series of experiments used wedge loaded compact shaped specimens. Strain energies in these specimens were obtained using compliance calibration technique and the fracture energy was obtained from photoelastic data. The results of an energy balance showed that about thirty and forty percent of the initial strain energy is lost away from the crack tip during fracture of 4340 steel and Homalite 100 specimens, respectively. The energy lost is comparable to the energy which disappears at the crack tip. Moreover, the energy loss away from the crack tip increased with initial strain energy. Dissert. Abstr.

N83-10439 Northwestern Univ., Evanston, Ill.
SOME ASPECTS OF ELASTIC BODIES IN CONTACT Ph.D. Thesis
Michael David Bryant 1981 93 p
Avail: Univ. Microfilms Order No. DA8204888

Various contact problems between two curved elastic bodies are formulated and solved with a view towards qualitatively assessing material damage and/or failure. Problems appropriate to two- and three-dimensional elasticity are solved. Damage parameters are evaluated and conclusions are drawn. Surface and subsurface stresses and displacements are obtained when two geometrically and elastically identical rough bodies are pressed together by normal and tangential loads. The interaction of prescribed Hertzian contact stresses, including friction, with an angled surface-breaking crack is studied with a view towards qualitatively explaining certain aspects of rolling contact fatigue. The two dimensional interaction over an elastic half space between an angled surface breaking crack and a contact region having prescribed parabolic normal displacements and prescribed frictional traction is studied. Dissert. Abstr.

N83-10440 State Univ. of New York, Buffalo.
FRACTURE LOCUS STUDIES IN A POLYMETHYL METHACRYLATE-POLYSTYRENE SYSTEM Ph.D. Thesis
Jamsheed Irani 1981 118 p
Avail: Univ. Microfilms Order No. DA8204071

The locus of propagation of a fracture front is investigated. It is very important to know if the failure is 'cohesive', i.e. in either bulk phase, or 'adhesive', i.e., along the interface. A theory developed to predict this locus, was based on a knowledge of certain bulk parameters of each phase and how they affect the behavior of the system as a whole. These parameters were the respective moduli, E sub 1 and E sub 2, and the bulk fracture energies, G sub 1 and G sub 2, of each phase. The theory predicted fracture to occur primarily in the phase with the lower value of the product, EG. This prediction was tested on a bonded polymethyl methacrylate polystyrene system. In this system, fracture was predicted to occur primarily in the polymethyl methacrylate phase with the lower value of the product, EG. It was found from the fracture energy data for different specimen configurations, that whenever polymethyl methacrylate was present as a phase, the fraction energy values of the bonded system resembled those of the polymethyl methacrylate, and were lower than the fracture energy values of the polystyrene system. Dissert. Abstr.

N83-10441*# Lockheed Missiles and Space Co., Palo Alto, Calif.
LOW-AUTHORITY CONTROL SYNTHESIS FOR LARGE SPACE STRUCTURES Final Report
J. N. Aubrun and G. Margulies Washington NASA Sep. 1982 99 p refs
(Contract NAS1-14887)
(NASA-CR-3495; NAS 1.26:3495) Avail: NTIS HC A05/MF A01 CSCL 20K

The control of vibrations of large space structures by distributed sensors and actuators is studied. A procedure is developed for calculating the feedback loop gains required to achieve specified amounts of damping. For moderate damping (Low Authority Control) the procedure is purely algebraic, but it can be applied iteratively when larger amounts of damping are required and is generalized for arbitrary time invariant systems. S.L.

N83-10442*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
CRASH TESTS OF FOUR LOW-WING TWIN-ENGINE AIRPLANES WITH TRUSS-REINFORCED FUSELAGE STRUCTURE
M. Susan Williams and Edwin L. Fasanella (Kentron International, Inc.) Sep. 1982 120 p refs
(NASA-TP-2070; L-15379; NAS 1.60:2070) Avail: NTIS HC A06/MF A01 CSCL 20K

Four six-place, low-wing, twin-engine, general aviation airplane test specimens were crash tested under controlled free flight conditions. All airplanes were impacted on a concrete test surface at a nomial flight path velocity of 27 m/sec. Two tests were conducted at a -15 deg flight path angle (0 deg pitch angle and 15 deg pitch angle), and two were conducted at a -30 deg flight path angle (-30 deg pitch angle). The average acceleration time histories (crash pulses) in the cabin area for each principal direction were calculated for each crash test. In addition, the peak floor accelerations were calculated for each test as a function of aircraft fuselage longitudinal station number. Anthropomorphic dummy accelerations were analyzed using the dynamic response index and severity index (SI) models. Parameters affecting the dummy restraint system were studied; these parameters included the effect of no upper torso restraint, measurement of the amount of inertia-reel strap pullout before locking, measurement of dummy chest forward motion, and loads in the restraints. With the SI model, the dummies with no shoulder harness received head impacts above the concussive threshold. M.G.

N83-10443# Council for Scientific and Industrial Research, Pretoria (South Africa). Geomechanics Div.
MEASURING PLANE STATES OF STRESS WITH REGULAR STRAIN GAUGE ROSETTES
F. A. Vreede Oct. 1981 15 p ref
(CSIR-ME-1731; ISBN-0-7988-1484-5) Avail: NTIS HC A02/MF A01

The material in a free surface is in a state of plane stress when atmospheric pressure is ignored. The components of this state of stress can be measured by means of strain gauges. If the directions of the principal stresses are known two gauges are needed to measure these stresses. If the directions are unknown, which is the general case, a minimum of three gauges must be used. If the loads are under the control of the experimeter the gauges are fixed to the surface of the material in the unloaded condition. Then the loads are applied and the strains induced thereby are measured. If the loads are permanent, as happens in rock faces, the gauges are fixed to the rock surface and then that area is overcored. The stresses are relieved and the strains induced thereby are measured. Although the strains are induced in different ways the interpretation theory is the same for both cases. The gauges are arranged as a rosette with equal angles between successive gauges. If the number of gauges in the rosette is n then the angle is equal to 180 deg/n. Such a rosette is called 'regular'. S.L.

N83-10444 Kansas Univ., Lawrence.
MATHEMATICAL PROGRAMMING IN PLASTIC ANALYSIS Ph.D. Thesis
Hossain Jalalabadi 1981 221 p
Avail: Univ. Microfilms Order No. DA8128755

For the strength and deformation analysis of plastic structures under the action of single stress (bending moment) mathematical programming formulations are developed and the associated problems are solved by the computer program developed on the basis of the available relevant computational techniques. In the case of simple plastic theory, for the strength analysis in the problem formulation, the kinematic and static theorems of plasticity are used. In the kinematic approach the load factor is minimized subject to the equilibrium and mechanism conditions. In the static approach the load factor is maximized subject to the equilibrium and yield conditions. For both, kinematic and static approach, the mathematical programming formulations were linear.Dissert. Abstr.

N83-10445 Illinois Univ. at Urbana-Champaign, Savoy.
THE BOUNDARY INTEGRAL EQUATION METHOD FOR TORSION OF AN INHOMOGENEOUS VARIABLE DIAMETER SHAFT Ph.D. Thesis
Yensen Wu 1981 59 p
Avail: Univ. Microfilms Order No. DA8203643

A boundary integral equation formulation is developed which is capable of analyzing the torsion of a variable diameter shaft with an axisymmetric shear modulus in a particular form. The governing differential equation for this problem is the equation of the generalized bi-axially symmetric potential theory and its fundamental solution can be obtained by considering the ring of potential. Piecewise-quadratic shape functions are used for the approximations of the functions and the boundary. Gaussian quadrature with four Gaussian points are used for the numerical integration. Stress concentration problems for the homogeneous U-grooved shaft, fillet shoulder shaft, and the inhomogeneous U-grooved shaft with an axial hole are examined. Possible future studies are suggested. Dissert. Abstr.

N83-10446 California Inst. of Tech., Pasadena.
FINITE PLANE AND ANTI-PLANE ELASTOSTATIC FIELDS WITH DISCONTINUOUS DEFORMATION GRADIENTS NEAR THE TIP OF A CRACK Ph.D. Thesis
Graeme Francis Fowler 1982 88 p
Avail: Univ. Microfilms Order DA8203353

The fully nonlinear theory of finite deformations of an elastic solid is used to study the elastostatic field near the tip of a crack. The special elastic materials considered are such that the differential equations governing the equilibrium fields may lose ellipticity in the presence of sufficiently severe strains. The first problem considered involves finite anti-plane shear (Mode 3) deformations of a cracked incompressible solid. The analysis is based on a direct asymptotic method, in contrast to earlier approaches which depended on hodograph procedures. The second problem treated is that of plane strain of a compressible solid containing a crack under tensile (Mode 1) loading conditions. The material is characterized by the so-called Blatz-Ko elastic potential. Again, the analysis involes only direct local considerations. For both the Mode 3 and Mode 1 problems, the loss of equilibrium ellipticity results in the appearance of curves (elastostatic shocks) issuing from the crack-tip across which displacement gradients and stresses are discontinuous. Dissert. Abstr.

N83-10447*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
OPTIMIZATION OF COMPOSITE STRUCTURES
W. Jefferson Stroud Aug. 1982 17 p refs Presented at IUTAM Symp. on Mech. of Composite Materials, Blacksburg, Va., 15-19 Aug. 1982
(NASA-TM-84544; NAS 1.15:84544) Avail: NTIS HC A02/MF A01 CSCL 20K

Structural optimization is introduced and examples which illustrate potential problems associated with optimized structures are presented. Optimized structures may have very low load carrying ability for an off design condition. They tend to have multiple modes of failure occurring simultaneously and can, therefore, be sensitive to imperfections. Because composite

materials provide more design variables than do metals, they allow for more refined tailoring and more extensive optimization. As a result, optimized composite structures can be especially susceptible to these problems. S.L.

N83-10448*# Clemson Univ., S.C. Dept. of Mechanical Engineering.
FRACTURE AND CRACK GROWTH IN ORTHOTROPIC LAMINATES. PART 1: ANALYSIS OF A HYBRID, UNIDIRECTIONAL LAMINATE WITH DAMAGE Annual Report
James G. Goree 15 Oct. 1982 53 p refs 2 Vol.
(Grant NsG-1297)
(NASA-CR-169461; NAS 1.26:169461) Avail: NTIS HC A04/MF A01 CSCL 20K

The fracture behavior of unidirectional hybrid (buffer strip) composite laminates is studied. Three particular solutions are discussed: (1) broken fibers in a unidirectional half plane; (2) adjoined half planes of different fiber and matrix properties and (3) the solution of two half planes bounding a third distinct region of finite width. This finite width region represents a buffer strip and the potential of this strip to arrest a crack that originates in one of the half planes is investigated. The analysis is based on a materials modeling approach using the classical shear lag assumption to described the stress transfer between fibers. Explicit fiber and matrix properties of the three regions are retained and changes in the laminate behavior as a function of the relative material properties, buffer strip width and initial crack length are discussed. S.L.

N83-10449*# Clemson Univ., S.C. Dept. of Mechanical Engineering.
FRACTURE AND CRACK GROWTH IN ORTHOTROPIC LAMINATES. PART 2: EXPERIMENTAL DETERMINATION OF INTERNAL DAMAGE GROWTH IN UNIDIRECTIONAL BORON/ALUMINUM COMPOSITE LAMINATES Annual Report
James G. Goree 15 Oct. 1982 106 p refs 2 Vol.
(Grant NsG-1297)
(NASA-CR-169462; NAS 1.26:169462) Avail: NTIS HC A06/MF A01 CSCL 20K

The fracture behavior of unidirectional boron/aluminum composite laminates is investigated in order to verify the results of mathematical models. These models predict the stresses and displacements of fibers and the amount of damage growth in a center-notched lamina as a function of the applied remote stress and the matrix and fiber material properties. The damage may take the form of longitudinal yielding and splitting in the matrix as well as stable transverse damage consisting of broken fibers and matrix yielding ahead of the notch. A brittle lacquer coating is used to detect the yielding in the matrix while X-ray techniques are used to detemine the number of broken fibers in the laminate. The notched strengths and the amounts of damage found in the experimental specimens agree well with those predicted by the mathematical model. S.L.

N83-10450# Princeton Univ., N. J. Dept. of Civil and Geological Engineering.
NONLOCAL EFFECTS OF CRACK CURVING
A. Cemal Eringen and A. Suresh Jul. 1982 22 p refs
(Contract N00014-76-C-0240)
(AD-A118285; Rept-82-SM-12; TR-57) Avail: NTIS HC A02/MF A01 CSCL 20/11

The nonlocal elasticity solution is obtained for the Griffith crack problem under combined loadings, Modes I and II. It is shown that the fracture begins at a critical point in the neighborhood of the crack tip. The location of the critical point is determined and the critical angle at which the crack begins to deviate from its straight line path is determined. These results are in good agreement with atomic lattice theory, and classical predictions. Author (GRA)

N83-10451# Gesellschaft fuer Kernenergieverwertung in Schiffbau und Schiffahrt m.b.H., Geesthacht (West Germany). Inst. fuer Physik.
REPRESENTATION OF CRACKS BY DISLOCATIONS AND ITS APPLICATION TO THE FRACTURE TOUGHNESS OF METALS [DAS VERSETZUNGSRISSMODELL UND SEINE ANWENDUNG AUF DIE RISSZAEHIGKEIT VON METALLEN]
M. Pfuff 15 Mar. 1982 42 p refs
(GKSS-82/E/11; ISSN-0344-9629) Avail: NTIS HC A03/MF A01

The representation of cracks by dislocations is introduced and applied to classical crack problems. This method reduces the calculation of the fracture toughness of plastically deformable solids to the calculation of the energy of continuous distributions of dislocations. The crack model introduced by Bilby, Cottrell and Swinden was modified in order to take the conditions into account which are necessary to activate the dislocation sources at the crack tip. This leads to a fracture criterion which can be used to explain the high values of the fracture toughness measured for metals and the characteristic brittle-to-ductile transition. Author (ESA)

N83-10452# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
STRESSES AROUND PIN-LOADED HOLES IN ELASTICALLY ORTHOTROPIC PLATES WITH ARBITRARY LOAD DIRECTION
T. deJong and H. A. Vuil Sep. 1981 77 p refs
(VTH-LR-333) Avail: NTIS HC A05/MF A01

Stresses were calculated for infinite orthotropic plates with a circular hole, loaded by a frictionless rigid pin of the same diameter under various angles with the symmetry axes of the material. The calculations are based on the analytical method of complex stress functions. A numerical approach was used in order to satisfy the displacement boundary conditions of the contact area between pin and hole. Stress concentration factors, based on the nominal bearing stress, are presented graphically for six laminates of carbon fiber reinforced plastic. A quadratic failure criterion was used to predict the bearing stress at which first significant damage occurs. Peak stresses, places where they occur, and bearing strength show directional sensitivity. Author (ESA)

N83-10453# Technische Hogeschool, Delft (Netherlands). Dept. of Aerospace Engineering.
THE STRESS DISTRIBUTION AROUND AN INFINITE ROW OF CIRCULAR HOLES IN AN ORTHOTROPIC PLATE
T. deJong Jan. 1982 56 p refs
(VTH-LR-340) Avail: NTIS HC A04/MF A01

An approximate solution is presented for the stresses around an infinite row of unloaded, equal circular holes in an orthotropic plate loaded at infinity. The calculations are based on the analytical method of complex stress functions. The complex stress functions are evaluated from the boundary conditions of a single, central hole. The influence of the other holes is represented by Taylor expansions of the elementary stress functions of these holes in the neighborhood of the central hole. The use of series implies a limited accuracy of the solution. The numerical evaluation, however, shows that the convergence of the series is good. Numerical results are obtained for a number of carbon fiber reinforced laminates. The isotropic case is included. Author (ESA)

N83-10454# CAMEA S.A., Buenos Aires (Argentina). Dept. of Engineering.
A FRACTURE MECHANISM MAP FOR PURE IRON
R. J. Fields and M. F. Ashby 1981 20 p refs
(PB82-189150; CUED/C-MATS/TR-32; ISSN-0309-6505) Avail: NTIS HC A02/MF A01 CSCL 11F

The mechanisms of fracture of round tensile specimens of pure iron were studied. These observations were combined with a large body of published observation and used to construct a fracture mechanism map, which summarizes the behavior. GRA

N83-10455# Sydney Univ. (Australia). School of Civil and Mining Engineering.
RAPID EXACT INELASTIC BIAXIAL BENDING ANALYSIS
J. M. Rotter Dec. 1981 54 p
(PB82-196650; Rept-R-405) Avail: NTIS HC A04/MF A01 CSCL 13M

A general analysis of cross sections subjected to axial force and biaxial bending is presented. The method is based on Green's theorem and allows for exact determination of stress-resultants and tangent stiffnesses for a given set of deformations when the section boundary is rectilinear. The method may be applied to cross sections of any mateial provided that the stress-strain relationships are integrable. The method is extremely rapid because stress integrals need only be evaluated at a small number of points on the section boundary. Unlike existing tangent stiffness methods, discontinuous stress-strain relationships may be used.
Author

N83-10007# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
CALCULATION OF STRESS INTENSITY FACTORS WITH HYBRID STRESS ELEMENTS AND ISOPARAMETRIC ELEMENTS
Jifan He, Liangming Chang, Zhanmin Gao, Zhousheng Li, and Duxin Sun *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 45-59 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 15 p Original language document announced as A82-22113 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01

N83-10008# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
AN ATTEMPT TO DERIVE A VARYING THICKNESS PLATE ELEMENT FROM HYBRID DISPLACEMENT METHOD
Gongxing Zhang and Junjiang Yu *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 60-71 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 12 p Original language document announced as A82-22114 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

N83-10217# NKF Engineering Associates, Inc., Vienna, Va.
AN APPROACH TO THE LIMITATION AND CONTROL OF SHIPBOARD VIBRATION
Edward F. Noonan *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 3-13 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10218# Imperial Coll. of Science and Technology, London (England).
STATE-OF-THE-ART ASSESSMENT OF MOBILITY MEASUREMENTS: A SUMMARY OF EUROPEAN RESULTS
D. J. Ewins *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 15-35 ref (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10220# Boeing Co., Seattle, Wash.
NECESSARY AND SUFFICIENT QUALIFICATION FOR SHOCK
Robert Dyrdahl *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 47-50 (For primary document see N83-10216 01-39)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10221# Westinghouse Electric Corp., Baltimore, Md.
MYTHS AND SACRED COWS IN SHOCK AND VIBRATION
Henry Caruso *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 51-54 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10222# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio. Flight Dynamics Lab.
ON MODELING VISCOELASTIC BEHAVIOR
Lynn Rogers *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 55-69 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10223# Anamet Labs., Inc., San Carlos, Calif. Applied Mechanics Div.
FINITE ELEMENT PREDICTION OF DAMPING IN BEAMS WITH CONSTRAINED VISCOELASTIC LAYERS
Conor D. Johnson, David A. Kienholz, and Lynn C. Rogers (AFWAL) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 71-81 refs Sponsored by AFWAL (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10224# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
DYNAMIC BEHAVIOR OF LATHE SPINDLES WITH ELASTIC SUPPORTS INCLUDING DAMPING BY FINITE ELEMENT ANALYSIS
A. M. Sharan, T. S. Sankar, and S. Sankar *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 83-96 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10225# Dayton Univ., Ohio.
FINITE ELEMENT ANALYSIS OF VISCOELASTICALLY DAMPED SANDWICH STRUCTURES
M. L. Soni *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 97-109 refs Sponsored by AFML and AFFDL (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10226# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
PNEUMATIC VIBRATION CONTROL USING ACTIVE FORCE GENERATORS
S. Sankar and R. R. Guntur *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 111-123 refs Sponsored by Natural Sciences and Engineering Research Council of Canada (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10227# Lord Kinematics, Erie, Pa.
THE EXPERIMENTAL PERFORMANCE OF AN ON-OFF ACTIVE DAMPER
E. J. Krasnicki *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 125-131 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10229# Naval Underwater Systems Center, New London, Conn.
MEDIA-STRUCTURE INTERACTION COMPUTATIONS EMPLOYING FREQUENCY DEPENDENT MESH SIZES WITH THE FINITE ELEMENT METHOD
A. J. Kalinowski and C. W. Nebelung *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 173-193 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10232# Harris Corp., Melbourne, Fla.
OPTIMIZING PRE- AND POST-PULSES FOR SHAKER SHOCK TESTING
R. T. Fandrich *In* Shock and Vibration Inform. Center Shock and Vibration Bull., Pt. 2 May 1981 p 1-13 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10233# Fruehauf Corp., Detroit, Mich. Systems Dept.
SHOCK, VIBRATION AND FATIGUE IN TRANSPORTATION INDUSTRIES
T. V. Seshadri *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 15-22 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10234# Pacific Missile Test Center, Point Mugu, Calif.
RANDOM IMPACT VIBRATION TESTOR

W. D. Everett *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 23-30 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10241# New Mexico Univ., Albuquerque.
CONSERVATISM IN LEAST FAVORABLE RESPONSE ANALYSIS AND TESTING
Thomas L. Paez *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 93-109 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10242# Kockums A.B., Malmoe (Sweden).
CALCULATING RESPONSES IN HULL MOUNTED ITEMS OF EQUIPMENT IN SUBMARINES COMPARED WITH MEASUREMENTS CARRIED OUT DURING SHOCK TESTS
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1928 p 111-119 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10244# Kockums A.B., Malmoe (Sweden).
A LARGE-SCALE SUBMARINE SHOCK TEST CARRIED OUT AS PART OF THE SWEDISH SHOCK DESIGN DEVELOPMENT PROGRAM
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 129-136 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10246# Pennsylvania State Univ., University Park.
ANALYSIS OF ENERGY-ABSORBING SHOCK MOUNTS
V. H. Neubert *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 149-167 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10248# Sandia Labs., Albuquerque, N. Mex. Explosives Testing Organization.
FEASIBILITY STUDY FOR THE SURFACE IMPULSE LOADING OF STRUCTURES USING MILD DETONATING FUZE
D. L. Shirey and Floyd H. Mathews *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 177-187 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10250# Tufts Univ., Medford, Mass. College of Engineering.
THE RESPONSE SPECTRUM METHOD OF SOLUTION FOR DISPLACEMENT EXCITATION
F. C. Nelson *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 205-209 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10251# Sandia Labs., Albuquerque, N. Mex.
AN IMPROVED RECURSIVE FORMULA FOR CALCULATING SHOCK RESPONSE SPECTRA
David O. Smallwood *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 211-217 refs Previously announced as N81-12367 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10252# Naval Surface Weapons Center, White Oak, Md.
A FINITE ELEMENT MODEL FOR FAILURE INITIATION IN SHOCK LOADED STRUCTURAL MATERIALS
David W. Nicholson *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 219-225 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/11

N83-10254# Polytechnic of Central London (England).
AN IMPROVEMENT TO SHAIKH'S METHOD FOR THE TORSIONAL VIBRATION ANALYSIS OF BRANCHED SYSTEMS
B. Dawson and M. Davies (Surrey Univ., England) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 1-10 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10259# Virginia Univ., Charlottesville.
EFFECTIVE DYNAMIC REANALYSIS OF LARGE STRUCTURES
B. P. Wang and F. H. Chu (RCA Astro-Electronics Div., Princeton, N. J.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 73-79 refs (For primary document see N83-10253 01-39)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10260# Concordia Univ., Montreal (Quebec). Dept. of Mechanical Engineering.
EFFECT OF STIFFENER ARRANGEMENT ON THE RANDOM RESPONSE OF A FLAT PANEL
R. B. Bhat and T. S. Sankar *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 81-87 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10262# Army Armament Research and Development Command, Watervliet, N. Y. Large Caliber Weapon Systems Lab.
VIBRATIONS OF A BEAM UNDER MOVING LOADS BY A FINITE ELEMENT FORMULATION CONSISTENT IN TIME AND SPATIAL COORDINATES
Julian J. Wu *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 111-130 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10263# Naval Surface Weapons Center, White Oak, Md.
THE BEND-BUCKLING OF A RING-STIFFENED CYLINDRICAL SHELL DUE TO WHIPPING EXCITATIONS
Kenneth A. Bannister *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 131-142 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10265# Lockheed Missiles and Space Co., Palo Alto, Calif.
TRANSIENT RESPONSE ANALYSIS OF A LARGE RADAR ANTENNA
E. Meller, W. A. Loden, and W. Woltornist (Lockheed Electronics Company, Inc., Plainfield, N. J.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 159-167 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10266# General Electric Co., Utica, N. Y. Aircraft Equipment Div.
FATIGUE LIFE PREDICTION FOR SIMULTANEOUS STRESS AND STRENGTH VARIANCES UNDER RANDOM VIBRATION
R. G. Lambert *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 169-176 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10267# Argonne National Lab., Ill.
DYNAMIC RESPONSE OF THE PROGRESSIVELY DAMAGING STRUCTURES
M. G. Srinivasan, G. U. Foneska (Illinois Univ., Chicago), and D. Krajcinovic (Illinois Univ., Chicago) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 177-187 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

N83-10271# Department of Agriculture, Madison, Wis.
A METHOD FOR DETERMINING THE EFFECT OF TRANSPOR

TATION VIBRATION ON UNITIZED CORRUGATED CONTAINERS
Thomas J. Urbanik *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 213-224 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/11

42 GEOSCIENCES (GENERAL)

No abstracts in this category.

43 EARTH RESOURCES

Includes remote sensing of earth resources by aircraft and spacecraft; photogrammetry; and aerial photography.

For instrumentation see *35 Instrumentation and Photography.*

N83-10456* National Aeronautics and Space Administration, Washington, D. C.
EARTH RESOURCES. A CONTINUING BIBLIOGRAPHY WITH INDEXES, ISSUE 34, JULY 1982
Jul. 1982 144 p
(NASA-SP-7041(34); NAS 1.21:7041(34)) Avail: NTIS HC $10.50 CSCL 05B

This bibliography lists 567 reports, articles, and other documents introduced into the NASA Scientific and Technical Information System between April 1, and June 30, 1982. Emphasis is placed on the use of remote sensing and geophysical instrumentation in spacecraft and aircraft to survey and inventory natural resources and urban areas. Subject matter is grouped according to agriculture and forestry, environmental changes and cultural resources, geodesy and cartography, geology and mineral resources, hydrology and water management, data processing and distribution systems, instrumentation and sensors, and economic analysis. Author

N83-10457 Kansas Univ., Lawrence.
A COMBINED OPTICAL/MICROWAVE APPROACH TO CROP CLASSIFICATION Ph.D. Thesis
Robert Yi-Ping Li 1981 194 p
Avail: Univ. Microfilms Order No. DA8128756

A combined optical/microwave approach to classification of remotely sensed data was undertaken. The primary objective is to investigate the capabilities of both the multispectal scanner (MSS) and the multifrequency, multipolarization microwave sensor to classify crops. The statistical properties of both sensors are examined with emphasis on the characterization of the radar data. Specifically, a radar system model is proposed and subsequently used for image simulation. Based on this model, the conditional density function of a given category is derived for the simulated radar data. The radar image pixels are simulated and classified by either using the field average of a given field or using the available within field measurements. By eliminating the within field variance, the field average approach produces higher classification accuracy. Furthermore, the contributions to the radar return from both the fading effect and the within field variance are examined. Dissert. Abstr.

N83-10458*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE LANDSAT TUTORIAL WORKBOOK: BASICS OF SATELLITE REMOTE SENSING
Nicholas M. Short, Principal Investigator 1982 554 p refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (E83-10001; NASA-RP-1078; NAS 1.61:1078; LC-81-600117) Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Most of the subject matter of a full training course in applying remote sensing is presented in a self-teaching mode in this how-to manual which combines a review of basics, a survey of systems, and a treatment of the principles and mechanics of image analysis by computers, with a laboratory approach for learning to utilize the data through practical experiences. All relevant image products are included. For individual titles, see N83-10459 through N83-10471.

N83-10459*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME FUNDAMENTAL CONCEPTS IN REMOTE SENSING
In its The LANDSAT Tutorial Workbook 1982 p 9-38 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The term remote sensing is defined as well as ideas such as class, pattern, feature, pattern recognition, feature extraction, and theme. The electromagnetic spectrum is examined especially those wavelength regions available to remote sensing. Relevant energy and wave propagation laws are discussed and the characteristics of emitted and reflected radiation and their detection are investigated. The identification of classes by their spectral signatures, the multispectral approach, and the principal types of sensors and platforms used in remote sensing are also considered. A.R.H.

N83-10460*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FAMILIARIZATION WITH LANDSAT IMAGERY
In its The LANDSAT Tutorial Workbook 1982 p 39-80 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Learning objectives of the activities provided include: (1) reading the annotation of a LANDSAT image; (2) becoming acquainted with the characteristics of 1:1,000,000 scale transparencies and prints of MSS images; (3) noting the general information visible in LANDSAT photo products; (4) observing changes of appearance of any ground feature or class in the black and white images made from the four MSS bands and the characteristic color of each class in color composites; (5) determining the degree to which a LANDSAT image meets map accuracy standards and can be fitted to map projections; (6) assessing the effects of LANDSAT enlargements and scale changes and of the limitations of satellite resolution relative to aerial photos; (7) observing the influence of time of acquisition (season) on a scene; (8) getting a feel for image quality as dependent on processing and photoreproduction; (9) appreciating the characteristics of the RBV and thermal band imagery obtained from LANDSAT-3; and (10) becoming familiar with certain attributes of adjacent LANDSAT images which permit them to be joined in mosaics and to be viewed in stereo. A.R.H.

N83-10461*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME SPECTRAL AND SPATIAL CHARACTERISTICS OF LANDSAT DATA
In its The LANDSAT Tutorial Workbook 1982 p 81-99 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Activities are provided for: (1) developing insight into the way in which the LANDSAT MSS produces multispectral data; (2) promoting understanding of what a 'pixel' means in a LANDSAT image and the implications of the term 'mixed pixel'; (3) explaining the concept of spectral signatures; (4) deriving a simple signature for a class or feature by analysis: of the four band images; (5) understanding the production of false color composites;

(6) appreciating the use of color additive techniques; (7) preparing Diazo images; and (8) making quick visual identifications of major land cover types by their characteristic gray tones or colors in LANDSAT images. A.R.H.

N83-10462*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PHOTOINTERPRETATION OF LANDSAT IMAGES
In its The LANDSAT Tutorial Workbook 1982 p 101-143 ref Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Learning objectives include: (1) developing a facility for applying conventional techniques of photointerpretation to small scale (satellite) imager; (2) promoting the ability to locate, identify, and interpret small natural and man made surface features in a LANDSAT image; (3) using supporting imagery, such as aerial and space photography, to conduct specific applications analyses; (4) learning to apply change detection techniques to recognize and explain transient and temporal events in individual or seasonal imagery; (5) producing photointerpretation maps that define major surface units, themes, or classes; (6) classifying or analyzing a scene for specific discipline applications in geology, agriculture, forestry, hyrology, coastal wetlands, and environmental pollution; and (7) evaluating both advantages and shortcomings in relying on the photointerpretive approach (rather than computer based analytical approach) for extracting information from LANDSAT data. A.R.H.

N83-10463*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
COMPUTER PROCESSED LANDSAT DATA
In its The LANDSAT Tutorial Workbook 1982 p 145-232 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Background information and exercises are provided to: (1) establish or expand understanding of the concepts, methods, and terminology of computer processing of image producing data; (2) develop insight into the advantages of computer based image processing compared with the photointerpretation approach for processing, classifying, interpreting, and applying remote sensing data; (3) foster a broad perspective on the principal of the main techniques for image enhancement, pattern recognition, and thematic classification; (4) appreciate the pros and cons of batch and interactive modes of image analysis; (5) examine and evaluate some specific computer generated products for subscenes in Pennsylvania and New Jersey; and (6) interrelate these particular examples of output with more theoretical explanations of computer processing strategies and procedures. A.R.H.

N83-10464*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
NEAR SURFACE OBSERVATIONS
In its The LANDSAT Tutorial Workbook 1982 p 233-276 ref Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Learning objectives include: (1) developing an understanding of the implications of the term 'near surface observations'; (2) associating the appearance of large ground features as seen in satellite imagery with their appearance as seen from the ground; (3) grasping criteria and procedures for selecting training sites on the ground for use in supervised classification; (4) running through an example of training site selection; (5) becoming familiar with several methods of accuracy assessment; (6) becoming aware of the approach and value of making supporting measurements of the spectral and physical properties of materials on the ground and from aircraft; (7) taking note of the different types of instruments used in making specific ground measurements; and (8) appreciating the rationale underlying laboratory and field studies on or near the Earth's surface for the purpose of developing new sensor systems. A.R.H.

N83-10465*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
GEOGRAPHIC INFORMATION SYSTEMS
William J. Campbell *In its* The LANDSAT Tutorial Workbook 1982 p 277-308 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Information and activities are provided to: (1) enhance the ability to distinguish between a Geographic Information System (GIS) and a data management system; (2) develop understanding of spatial data handling by conventional methods versus the automated approach; (3) promote awareness of GIS design and capabilities; (4) foster understanding of the concepts and problems of data base development and management; (5) facilitate recognition of how a computerized GIS can model conditions in the present 'real world' to project conditions in the future; and (6) appreciate the utility of integrating LANDSAT and other remotely sensed data into the GIS. A.R.H.

N83-10466*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A CASE STUDY IN THE PRACTICAL USE OF LANDSAT DATA
Scott Cox *In its* The LANDSAT Tutorial Workbook 1982 p 309-326 Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The use of computer aided classification of LANDSAT data in developing water quality plans for New Jersey watersheds is used to exemplify how a state natural resource management program benefits from satellite imagery. The transition of a research and development system into an operational remote sensing system to help decision makers is demonstrated. Nontechnial issues that can assist (or hinder) an agency in adopting a new technology are examined. The progress of LANDSAT use by state government from the earliest stage of curiosity through to incorporation in actual state planning methods is charted. Potential applications of LANDSAT data to real information needs and solutions to management problems are examined. The problems and mistakes that occurred in using LANDSAT data in the past are discussed as well as the ways by which these problems were overcome. A.R.H.

N83-10467*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OTHER REMOTE SENSING SYSTEMS: RETROSPECT AND OUTLOOK
In its The LANDSAT Tutorial Workbook 1982 p 327-387 refs Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The history of remote sensing is reviewed and the scope and versatility of the several remote sensng systems already in orbit are discussed, especially those with sensors operating in other EM spectral modes. The multisensor approach is examined by interrelating LANDSAT observations with data from other satellite systems. The basic principles and practices underlying the use of thermal infrared and radar sensors are explored and the types of observations and interpretations emanating from the Nimbus, Heat Capacity Mapping Mission, and SEASAT programs are examined. Approved or proposed Earth resources oriented missions for the 1980's previewed include LANDSAT D, Stereosat, Gravsat, the French satellite SPOT-1, and multimission modular spacecraft launched from space shuttle. The pushbroom imager, the linear array pushbroom radiometer, the multispectral linear array, and

the operational LANDSAT observing system, to be designed the LANDSAT-E series are also envisioned for this decade. A.R.H.

N83-10468*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SOME CLOSING THOUGHTS: PRACTICAL PAYOFFS FROM SATELLITE SYSTEMS
In its The LANDSAT Tutorial Workbook 1982 p 389-407 refs Original contains imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The benefits-to-cost ratio of satellite remote sensing, both as a substitute for conventional methods of monitoring and assessing resources, and as a supplement to these methods is examined using a model which analyzes the cost of aerial photography versus satellite scanner for producing and interpreting an image of the Earth's surface sized to LANDSAT dimensions. Examples of cost savings are tabulated for ground surveys, aerial photos, and LANDSAT. Possible additional benefits from LANDSAT D are assessed. The way in which satellites fit into more comprehensive models for resources management is discussed. It is shown that remote sensing is but one essential component in a complex system that aggregates technical. Socioeconomics, political, cultural, and other factors in the human decision process. A.R.H.

N83-10469*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APPENDIX A: THE LANDSAT SYSTEM
Stanley C. Freden *In its* The LANDSAT Tutorial Workbook 1982 p 409-419 ref ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

The primary LANDSAT mission and the system requirements are summarized and pertinent parameters of the spacecraft, its orbit, and payload are tabulated. The history acquisition to entry into the archives for storage and product generation and dissemination is recounted. The LANDSAT D data handling plan is discussed showing requirements for both the MSS CCT and the thematic mapper CCT. A.R.H.

N83-10470*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APPENDIX B: PRINCIPLES OF COMPUTER PROCESSING OF LANDSAT DATA
In its The LANDSAT Tutorial Workbook 1982 p 421-453 ref Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Computer processing facilitates extraction of information from every pixel by executing a variety of functional operations, called processed algorithms, in general or specialized routines. The best results are obtained when data from more than one multispectral band are used together. Multivariate tatistical analysis, computer tape characteristics, processing modes, and a choice of systems (batch or interactive) are discussed. The major operations in computer processing elaborated include: preprocessing, enhancement, effects of rationing, and classification. Techniques for multisource data correlation are considered with emphasis on geobased systems. A.R.H.

N83-10471*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
APPENDIX C. LANDSAT: A WORLDWIDE PERSPECTIVE
In its The LANDSAT Tutorial Workbook 1982 p 455-475 ref Original contains color imagery. Original photography may be purchased from the EROS Data Center, Sioux Falls, S.D. 57198. ERTS (For primary document see N83-10458 01-43)
Avail: NTIS MF A01; SOD HC $55.00 CSCL 05B

Images characteristics of geographic regions other than the northeastern part of the United States are presented for interpretation. Pre- and post-eruption imagery of Mt. St. Helens volcano serves to demonstrate the advantages of thermal infrared sensing, and the potential for developing a timely, decision oriented thematic map to be used in solving drought-related problems in Upper Volta is examined to show the applicability of satellite remote sensing in all geographic areas. A.R.H.

N83-10472*# Massachusetts Inst. of Tech., Cambridge. Hydrology and Water Resource Systems.
A SECOND-ORDER BUDKYO-TYPE PARAMETERIZATION OF LANDSURFACE HYDROLOGY Semiannual Progress Report
Stefanos A. Andreou and Peter S. Eagleson Jun. 1982 143 p refs
(Grant NAG5-134)
(NASA-CR-169432; NAS 1.26:169432; R82-36; Rept-280) Avail. NTIS HC A07/MF A01 CSCL 08H

A simple, second order parameterization of the water fluxes at a land surface for use as the appropriate boundary condition in general circulation models of the global atmosphere was developed. The derived parameterization incorporates the high nonlinearities in the relationship between the near surface soil moisture and the evaporation, runoff and percolation fluxes. Based on the one dimensional statistical dynamic derivation of the annual water balance, it makes the transition to short term prediction of the moisture fluxes, through a Taylor expansion around the average annual soil moisture. A comparison of the suggested parameterization is made with other existing techniques and available measurements. A thermodynamic coupling is applied in order to obtain estimations of the surface ground temperature. S.L.

N83-10473*# Ocean Data Systems, Inc., Monterey, Calif.
SEASAT-A SASS WIND PROCESSING
Rodger A. Langland, Pamela L. Stephens, and Gregory G. Pihos Mar. 1980 9 p Prepared for JPL, Pasadena
(Contract JPL-955370)
(NASA-CR-169433; JPL-9950-738; NAS 1.26:169433) Avail: NTIS HC A02/MF A01 CSCL 08C

The techniques used for ingesting SEASAT-A SASS wind retrievals into the existing operational software are described. The intent is to assess the impact of SEASAT data in the marine wind fields produced by the global marine wind/sea level pressure analysis. This analysis is performed on a 21/2 deg latitude/longitude global grid which executes at three hourly time increments. Wind fields with and without SASS winds are being compared. The problems of data volume reduction and aliased wind retrieval ambiquity are treated. A.R.H.

N83-10474# Colorado School of Mines, Golden. Exploratory Research Lab.
GEOPHYSICAL DETECTION OF GROUNDWATER Final Technical Report, Sep. 1980 - Apr. 1982
James K. Applegate, Richard D. Markiewicz, and Brian D. Rodriquez Apr. 1982 99 p refs
(Contract DAAK70-80-C-0086; DA Proj. 1L1-62733-AH-20)
(AD-A117277) Avail: NTIS HC A05/MF A01 CSCL 08/8

A review was undertaken of the use of conventional geophysical methods for the detection of groundwater. Geophysical methodology has been used for a number of years in groundwater exploration. However, the total cost of groundwater exploration efforts has been miminal and, hence, there has been no extensive development of specific techniques and procedures for exploring for groundwater. It is proposed that using currently available geophysical methods, namely electrical and seismic methods, in an integrated fashion (e.g. in a manner in which one measures multiple parameters) is the most viable way to undertake groundwater exploration. Instrumentation on the market today is applicable to groundwater exploration, and there does not appear to be the need for significant development of instrumentation. However, there is the opportunity to develop other more efficient methodologies, and also to develop both improved and enhanced interpretation procedures. These improved interpretation methods will undoubtedly rely quite extensively on microprocessor based hardware. Computerbased analysis of data improves the ability to

interpret noisy data, and also facilitates the interpretation of data by inexperienced individuals. The computer hardware for implementing many proposed interpretation algorithms is now available. GRA

N83-10475# Defense Mapping Agency Aerospace Center, St. Louis, Mo. Advanced Systems Branch.
STANDARDIZATION OF MAP SYMBOLOGY
Robert P. Jacober, Jr. Jun. 1982 7 p refs Presented at the Am. Soc. of Photogrammetry, Hollywood, Fla., 19-23 Sep. 1982 (AD-A117530) Avail: NTIS HC A02/MF A01 CSCL 08/2

In order to effectively communicate, man must have a common language. In the conventional or digital cartographic sphere, this axiom is no less true. Symbols form the language of cartography. Ideally, a worldwide standard set of symbols would solve many of the communication problems. But, this ideal solution is not technically feasible. However, within scale families of maps, standard symbology should be sought, especially in computer cartographic applications. This paper addresses the need for a standard for map symbology, particularly large scale maps, and suggests such a standard. Author (GRA)

N83-10476# Sandia Labs., Albuquerque, N. Mex.
WATER RELEASE AND MECHANICAL FAILURE IN HEATED GEOLOGIC SALT
J. J. Hohfelder, A. G. Beattie, and H. C. Shefelbine Feb. 1982 23 p refs
(Contract DE-AC04-76DP-00789)
(DE82-012054; SAND-81-1488) Avail: NTIS HC A02/MF A01

The rate of water release and the acoustic emission rate were measured in heated specimens of geologic salt. These measurements show that changes in thermal power applied to the salt cause increased acoustic emission from the salt. The acoustic emission is caused by the salt's cracking. The salt's cracking enhances its prompt release of water. DOE

N83-10477# California Univ., Livermore. Lawrence Livermore Lab.
HYDROLOGIC TEST SYSTEM FOR FRACTURE FLOW STUDIES IN CRYSTALLINE ROCK
Ellen Raber, David Lord, and Patrick Burkland 5 May 1982 22 p refs
(DE82-016361; UCID-19405) Avail: NTIS HC A02/MF A01

A hydrologic test system has been designed to measure the intrinsic permeabilities of individual fractures in crystalline rock. This system is used to conduct constant pressure-declining flow rate and pressure pulse hydraulic tests. The system is composed of four distinct units: (1) the Packer System, (2) Injection system, (3) Collection System, and (4) Electronic Data Acquisition System. The apparatus is built in modules so it can be easily transported and re-assembled. It is also designed to operate over a wide range of pressures (0 to 300 psig) and flow rates (0.2 to 1.0 gal/min). This system has proved extremely effective and versatile in its use at the Climax Facility, Nevada Test Site. DOE

N83-10478# Ruhrkohle A.G., Essen (West Germany).
IMPROVED ROADHEADING BY DINTING BEHIND THE FACE LINE TO FULL SECTION Final Report, Mar. 1981
Josef Seeger Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 30 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-087; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,50

A roadheading advance rate which keeps pace with increased face advance by systematic application of techniques developed in the field of roadheading, face operations, and support setting was sought. Simultaneously, the roadway stability was to be increased for keeping roadway maintenance expenditure at a minimum. During trials, however, unexpected swelling of the floor occured to such an extent that the special shield units and the integrated roof bolting drilling equipment could not fulfill the tasks assigned. Also, the support design tailored to the technique did not withstand the high strata pressures. For operational and economic reasons, therefore, the project was aborted and, as before the trials, the road was headed in advance of the face. Author (ESA)

N83-10479# Institut fuer Erdoelforschung, Hanover (West Germany).
CRITICAL RELATIONSHIPS FOR DISPLACEMENT PROCESSES IN OIL FIELDS Final Report, Oct. 1981
Sabri Tunc Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 43 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-093; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

The correlation of various essentially defined parameters for displacement processes was examined in order to find the critical values describing oil mobility with the aim of optimal oil recovery. The relationships between the permeabilities and the mobility ratios with displacement efficiency were determined. The three most important dimensionsless characteristic values were discussed with the help of experimental results. It is discovered that with suitable co-surfactants stable microemulsions can be formed between the oil and the water phases. The microemulsion contains almost all the surfactants used. Due to the fact that this middle phase emulsion does not have high viscosity and behaves as a Newton fluid, a very low pressure gradient is encountered during the displacement process so that an optimal displacement efficiency for the system an be achieved. Author (ESA)

N83-10480# Geological Survey, Menlo Park, Calif. Branch of Regional Geophysics.
PRINCIPAL FACTS, ACCURACIES, SOURCES AND BASE STATION DESCRIPTIONS FOR 4915 GRAVITY STATIONS ON THE SAN BERNADINO 1 DEG X 2 DEG QUADRANGLE, CALIFORNIA Final Report
R. W. Tang and D. A. Ponce 1982 104 p refs
(PB82-200312; USGS-GD-82-004) Avail: NTIS HC A06/MF A01 CSCL 08E

Principal facts for 4,915 gravity stations on the San Bernardino, CA quadrangle, are tabulated and accompanied by base station descriptions and station location plots. All gravity data were reduced to complete Bouguer anomalies and are listed in eight tables according to source. Author

N83-10481# Bureau of Mines, Pittsburgh, Pa.
COMPUTERIZED, REMOTE MONITORING SYSTEMS FOR UNDERGROUND COAL MINES: FIRES AND EXPLOSIVE ATMOSPHERES
Jeffrey H. Welsh Apr. 1982 15 p refs
(PB82-221359; BM-IC-8875) Avail: NTIS HC A02/MF A01 CSCL 08I

The use of computerized, continuous remote monitoring systems for fire and explosive atmosphere safety in underground coal mines was studied. The effects of these systems on the safety level in mines are investigated, and the relationship between mine safety regulations and computerized, continuous, remote monitoring is analyzed. M.G.

N83-10482# Minnesota Univ., Minneapolis. Hydraulic Lab.
NUMERICAL AND GRAPHICAL PROCEDURES FOR ESTIMATION OF COMMUNITY PHOTOSYNTHESIS AND RESPIRATION IN EXPERIMENTAL STREAMS
John S. Gulliver, Tedd W. Mattke, and Heinz G. Stefan 27 Oct. 1982 138 p refs
(PB82-220765; EPA-600/3-82-052) Avail: NTIS HC A07/MF A01 CSCL 13B

A numerical dissolved oxygen (D.O.) routing model DORM is developed to determine total stream community photosynthesis (P) and community respiration rates (R) through successive routing of two-station diel D.O. measurements in a stream. The model

differs from existing procedures for diel curve productivity analysis in that it uses the complete D.O. transport equation, including D.O. surface exchange, longitudinal dispersion, dependence of respiratory rates on water temprature and dissoved oxygen. The model is applied to the experimental field channels at the USEPA Monticello Ecological Research Station to compute P and R values at different seasons and under different conditions of water temperatures, solar radiation, and pH. A sensitivity analysis showed that computed P and R values are most sensitive to residence times and surface oxygen exchange (reaeration) coefficients. Equations for surfce exchange including the effect of wind were developed and are summarized. Author

N83-10483# Rhode Island Univ., Narragansett. Dept. of Ocean Engineering.

REMOTE SENSING, A TOOL FOR MANAGING THE MARINE ENVIRONMENT: EIGHT CASE STUDIES

Gregory Behie and Peter Cornillon 1982 44 p
(Contract SG-NA79AA-D-00096)
(PB82-220864; URI-MTR-77; NOAA-81072405) Avail: NTIS HC A03/MF A01 CSCL 13B

The applications of remote sensing described are not confined to satellite-derived imagery. The common link between all eight applications, which involved several remote-sensing techniques, is the usefulness of remote sensing in making needed management decisions. Similar projects in the future will definitely use satellites in some instances, while in others aircraft may remain the best tool. The purpose in presenting these case studies is to suggest the variety of ways in which remote sensing can be useful in studying the coastal and marine environment. It is hoped that the diversity of applications described, of data sources and platforms used (satellite/aircraft), as well as the high-quality photographs that resulted, may identify for the reader potential applications in his or her own area of interest. Author

N83-10484# National Oceanic and Atmospheric Administration, Rockville, Md.

RESULTS OF LEVELING REFRACTION TESTS BY THE NATIONAL GEODETIC SURVEY

Charles T. Whalen Nov. 1981 27 p refs
(PB82-193921; NOAA-82032214; NOAA-TR-NOS-92-NGS-22) Avail: NTIS HC A03/MF A01 CSCL 08E

Leveling refraction tests at a site near Gaithersburg, Md., during July to September 1979, and at a site near Tucson, Ariz., in April 1980 were designed to measure refraction errors between bench marks at sight distances of 30, 45, 50 and 60 by comparing nominal 2 meter refraction free elevation differences to observed elevation differences containing refraction errors. The refraction free elevation differences were determined using sight distances of 13 m or less. The effectiveness of the refraction correction equations was evaluated using temperature differences computed from air temperatures observed at 0.5, 1.5, and 2.5 m above the ground surfaces at the test sites. The excellent test results indicate that leveling observations from past surveys can be greatly improved by applying refraction corrections based on Holdahl's modeled air temperature differences. Application of the Garfinkel and Kukkamaki equations to differences computed from observed air temperatures reduced the sum of the values for nighttime observations by 70 and 89%, respectively. GRA

N83-10485# Bureau of Mines, Anchorage, Alaska. Field Operations Center.

CRITICAL AND STRATEGIC MINERALS IN ALASKA: COBALT, THE PLATINUM-GROUP METALS AND CHROMITE

J. C. Barker, J. C. Still, T. C. Mowatt, and J. J. Mulligan Feb. 1982 20 p refs
(PB82-193085; BM-IC-8869) Avail: NTIS HC A02/MF A01 CSCL 08I

The Bureau of Mines' Alaska Field Operations Center and the Bureau's research centers at Albany, Oreg., and Reno, Nev., are cooperating in a long-range program to investigate occurrences and delineate reserves of cobalt, the platinum-group metals, and chromite in Alaska. GRA

N83-10486# Geological Survey, Lakewood, Colo. Water Resources Div.

WATER RESOURCES DATA FOR COLORADO, WATER YEAR 1980. VOLUME 3: DOLORES RIVER BASIN, GREEN RIVER BASIN AND SAN JUAN RIVER BASIN Annual Report, 1 Oct. 1979 - 30 Sep. 1980

Feb. 1982 467 p Sponsored by the State of Colorado and other agencies
(PB82-202045; USGS/WDR/CO-80-3-Vol-3; USGS/WRD/HD-81-064-Vol-3) Avail: NTIS HC A20/MF A01 CSCL 08H

Water resources data for Colorado for the 1980 water year consists of records of stage, discharge, and water quality of streams, stage, contents, and water quality of lakes and reservoirs, and water levels and water quality of wells and springs. Discharge records for abour 460 gaging stations, stage and contents of 22 lakes and reservoirs, 4 partial record low flow stations, 30 crest stage partial record stations, and 50 miscellaneous sites; water quality for 163 gaging stations and 300 miscellaneous sites; and water levels for 55 observation wells. A few pertinent stations in bordering states are also included. E.A.K.

N83-10487# National Oceanic and Atmospheric Administration, Boulder, Colo.

SELECTED GEOPHYSICAL ACTIVITIES OF THE UNITED STATES, 1977-1981. A QUINQUENNIUM OF COOPERATION AND PROGRESS Progress Report

Kendall L. Svendson, ed. and James N. Jordan, ed. Mar. 1982 60 p refs Presented at the 4th Pan-Am. Consultation on Geophys., Santiago de Chile, 22-27 Mar. 1982
(PB82-202847; NOAA-82040705; SE-30) Avail: NTIS HC A04/MF A01 CSCL 08E

This report was submitted by the United States Member of the Commission on Geophysics of the Panamerican Institute of Geography and History, a specialized agency of the Organization of the American States. It contains information on some of the United States activities of interest to the Commission and its committees. The specific fields included are: seismology, gravity, geomagnetism, geophysical exploration, volcanology, geothermics, solar terrestrial physics and oceans and atmospheres. Author

N83-10488# Geological Survey, Helena, Mont. Water Resources Div.

STEAMFLOW CHARACTERISTICS OF THE UPPER COLUMBIA RIVER BASIN, MONTANA THROUGH 1979 Final Report

Scott D. Waltemeyer and Ronald R. Shields Mar. 1982 80 p refs Prepared in cooperation with the Montana Dept. of Natural Resources and Conservation, Helena
(PB82-185760; USGS/WRD/WRI/82-007; USGS/WRI-81-82) Avail: NTIS HC A05/MF A01 CSCL 08H

Statistical summaries of streamflow data for selected stream gaging sites are presented to aid in appraising the hydrology of the upper Columbia River basin in Montana. Streamflow records are presented for 54 gaging stations for the period of record. Records for five gaging stations were compiled into separate periods owing to change in regulation after data collection commenced. The entire period of record, the period before regulation, and the period after regulation are presented for comparison. For each gaging station selected, a brief description is given for station location, drainage area, period of record, revisions of published records, type and history of gages, regulation and diversions, and extremes of discharge. These data are followed by tables of monthly and annual flow statistics, flood frequency data, low flow and high flow frequency data, and flow duration information. GRA

N83-10489# National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Environmental Research Labs.

A TWO-DIMENSIONAL LAKE CIRCULATION MODELING SYSTEM

David J. Schwab, John R. Bennett, and Andrew T. Jessup Oct. 1981 86 p refs
(PB82-185372; NOAA-82012902; NOAA-TM-ERL-GLERL-38)

Avail: NTIS HC A05/MF A01 CSCL 08H

A series of computer programs for modeling circulation and water level fluctuations in well mixed lakes were examined. The three FORTRAN coded programs are: (1) a grid generation and modification program; (2) a free surface circulation model; and (3) a rigid lid circulation model. The models are based on the vertically integrated shallow water equations and include Coriolis effects, but neglect nonlinear acceleration terms and horizontal diffusion of momentum. The user of the programs is required to supply bathymetric data, initial conditions, external forcing function, and a subroutine to generate the desired output parameters. The programs serve as a basis for developing more complex models.
Author (GRA)

N83-10490# Geological Survey, Tallahassee, Fla. Water Resources Div.
SINKHOLE DEVELOPMENT RESULTING FROM GROUND-WATER WITHDRAWAL IN THE TAMPA AREA, FLORIDA
William C. Sinclair 1982 26 p refs Prepared in cooperation with the Southwest Florida Water Management District, Brooksville
(PB82-185141; USGS/WRD/WRI/82-006; USGS/WRI-81-50) Avail: NTIS HC A03/MF A01 CSCL 08H

The area of municipal well fields on the Gulf Coastal Plain north of Tampa which is pitted with natural sinkholes and sinkhole lakes resulting from collapse of surficial sand and clay into solution cavities in the underlying carbonate rocks of the Floridan aquifer is discussed. Solution of the underlying rocks is the ultimate cause of sinkholes, however, some have been induced by abrupt changes in ground water levels caused by pumping. Most induced solution takes place at the limestone surface, however, the area of induced recharge is so extensive tha the effect of induced limestone solution on sinkhole development is negligible. Alinement of established sinkholes along joint patterns in the bedrock suggests that a well located along these lineations may have direct hydraulic connection with a zone of incipient sinkholes. Therefore, installation of large capacity wells along such lineations would increase the probability of sinkhole development. E.A.K.

N83-10491# Geological Survey, Portland, Oreg. Water Resources Div.
WATER RESOURCES DATA FOR OREGON WATER YEAR 1980. VOLUME 1: EASTERN OREGON Annual Report, 1 Oct. 1979 - 30 Sep. 1980
Dec. 1981 258 p
(PB82-190356; USGS/WDR/OR-80-1) Avail: NTIS HC A12/MF A01 CSCL 08H

Water resources data for the 1980 water year for Oregon consist of records of stage, discharge, and water quality of streams; stage, contents, and water quality of lakes and reservoirs; and water levels and water quality in wells and springs. Discharge records for 287 gaging stations; stage only records for 10 gaging stations; stage and contents for 41 lakes and reservoirs; water quality for 98 gaging stations, water levels for 68 observation wells; and water quality for 6 precipitation stations are reported. Included are 49 crest stage partial record stations. Additional water data are collected at various sites, not part of the systematic data collection program. GRA

N83-10492# Bureau of Mines, Pittsburgh, Pa.
CANOPY-AIR CURTAIN DUST REDUCTIONS ON A GATHERING-ARM LOADER
Jon C. Volkwein, Steven J. Page, and Edward D. Thimons Jan. 1982 14 p
(PB82-177791; BM-RI-8603) Avail: NTIS HC A02/MF A01 CSCL 08I

The canopy-air curtain was originally developed by the Bureau of Mines to surround the operator of a continuous mining machine with a zone of clean air. This report describes the application and testing of a canopy-air curtain on a gathering-arm loader, as well as some of the problems associated with providing a zone of clean air to a standing, semimobile operator. The area of air-curtain coverage and effects of air velocity are discussed. In its present form, the canopy-air curtain provides a 50 percent reduction in respirable dust to the operator. Author

N83-10493# Bureau of Mines, Denver, Colo.
ELECTROMAGNETIC RADIATION FROM ROCK FAILURE
David R. Hanson and Glen A. Rowell Jan. 1982 28 p refs
(PB82-177338; BM-RI-8594) Avail: NTIS HC A03/MF A01 CSCL 08I

Experimental work performed by the Bureau of Mines in a laboratory environment has shown that the formation of failure zones within certain rock types is accompanied by the emission of significant amounts of radio frequency (RF) electromagnetic (EM) energy. This radiation was detected using nonresonant, 'electrically short,' broadband antennas. Rock types for which emission was observed include granite, quartzite, and taconite; sandstone and marble did not emit measurable radiation. Amplitude spectra of the radiation showed the energy to be concentrated between 10 and 40 kilohertz. These data indicate that emission is directional, but this has not yet been proven. In addition, amplitude of RF emission increases with increasing crack size. Since emission was observed only for brittle quartz-bearing rocks, it appears the formation of piezoelectric fields is a necessary condition for RF radiation. Author (GRA)

44 ENERGY PRODUCTION AND CONVERSION

Includes specific energy conversion systems, e.g., fuel cells and batteries; global sources of energy; fossil fuels; geophysical conversion; hydroelectric power; and wind power.

For related information see also *07 Aircraft Propulsion and Power, 20 Spacecraft Propulsion and Power, 28 Propellants and Fuels,* and *85 Urban Technology and Transportation.*

N83-10494* National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
METHOD FOR DEPOSITING AN OXIDE COATING Patent
Glen E. McDonald, inventor (to NASA) Issued 21 Sep. 1982 7 p Filed 23 Mar. 1981 Supersedes N81-24230 (19 - 15, p 2033)
(NASA-Case-LEW-13131-1; US-Patent-4,350,574;
US-Patent-Appl-SN-246772; US-Patent-Class-204-56R) Avail: US Patent and Trademark Office CSCL 10A

A metal oxide coating is plated onto a metal substrate at the cathode from an acid solution which contains an oxidizing agent. The process is particularly useful for producing solar panels. Conventional plating at the cathode avoids the presence of oxidizing agents. Coatings made in accordance with the invention are stable both at high temperatures and while under the influence of high photon flux in the visible range.
Official Gazette of the U.S. Patent and Trademark Office

N83-10495# British Library Lending Div., Boston Spa (England).
EXPERIMENTS ON THE ADAM 1 PLANT FOR THE OPTIMISATION OF METHANIZATION PROCESS IN THE LONG DISTANCE NUCLEAR ENERGY TRANSMISSION SYSTEM TEST RUN PERFORMED IN THE SPRING OF 1980
B. Hoehlein, R. Menzer, M. Vorwerk, and A. Skov 15 Sep. 1982 44 p refs Transl. into ENGLISH of rept. from Kernforschungsanlage, Julich, West Germany, Oct. 1980 38 p
(BLL-T5869/BG/MRS14614/82) Avail: British Library Lending Div., Boston Spa, Engl.

Various problems of the methanation in gs synthesis to improve the long distance nuclear energy system were investigated. Important results were obtained regarding high temperature methanation of up to 700 C, to a closed steam reforming methanation circuit, and to the operation of a recycle ejector in ADAM 1 which limits the outlet temperature of the first reactor. E.A.K.

N83-10496 State Univ. of New York, Buffalo.
EXTERNAL IONIZATION MECHANISMS FOR ADVANCED THERMIONIC CONVERTERS Ph.D. Thesis
Marios E. Hatziprokopiou 1981 116 p
Avail: Univ. Microfilms Order No. DA8204065

Ion generation and recombination mechanisms in the cesium plasma were investigated as they pertain to the advanced mode thermionic energy converters. The changes in plasma density and temperature within the converter were studied under the influence of several promising auxiliary ionization candidate sources. Three novel approaches of external cesium ion generation were investigated in some detail, namely vibrationally excited N2 as an energy source of ionization of Cs ions in a DC discharge, microwave power as a means of resonant sustenance of the cesium plasma, and ion generation in a pulse N2-Cs mixture. The experimental data obtained and discussed in this work show that all three techniques--i.e. the non-LTE high-voltage pulsing, the energy transfer from vibrationally excited diatomic gases, and the external pumping with a microwave power--have considerable promise as schemes in auxiliary ion generation applicable to the advanced thermionic energy converter. Dissert. Abstr.

N83-10497 Columbia Univ., New York.
MEMBRANE CONTROLLED ANAEROBIC DIGESTION Ph.D. Thesis
Daniel Ralph Omstead 1981 155 p
Avail: Univ. Microfilms Order No. DA8204530

In response to general shortages of energy, examination of the anaerboic digestion process as a potential source of a combustible, methane-rich fuel has intensified in recent years. It has been suggested that organic intermediates (such as fatty acids), produced during digestion, might also be recovered for use as chemical feedstocks. This investigation has been concerned with combining ultrafiltration separation techniques with anaerobic digestion for the development of a process in which the total production of acetic acid (the most valuable intermediate in anaerobic digestion) and methane are optimized. Enrichment cultures, able to utilize glucose as a sole carbon source, were adapted from sewage digesting cultures using conventional techniques. An ultrafiltration system was constructed and coupled to an anaerobic digester culture vessel which contained the glucose enrichment. The membrane controlled anaerobic digester appears to show promise as a means of producing high rates of both methane gas and acetic acid. Dissert. Abstr.

N83-10498# Houston Univ., Tex.
WATER DEMAND FOR GENERATING ELECTRICITY: A MATHEMATICAL PROGRAMMING APPROACH WITH APPLICATION IN POLAND
John C. Stone, F. Dail Singleton, Jr., Andrzej Salewicz (Inst. of Meteorol. and Water Management), M. Gadkowski (Inst. of Meteorol. and Water Management), and Witold Sikorski (International Inst. for Applied Systems Analysis) Laxemburg, Austria International Inst. for Applied Systems Analysis Apr. 1982 66 p refs Sponsored by Siftung Volkswagenwerk
(IIASA-RR-82-16; ISBN-3-7045-0036-4) Copyright. Avail: Issuing Activity

A resource use model for a coal fired power plant on a river was developed. The model optimizes plant design and operation in a number of user defined seasons. Alternative modes of coal transport, railroad, and slurry pipeline are modeled. Air and water quality dominate optimization. Coefficients are specified using matrix generators. Demand curves for water withdrawals and heat discharges, a water loss-withdrawal tradeoff, and the effects on the marginal and average costs of electricity due to reducing water withdrawals are calculated. Author (ESA)

N83-10499 International Institute for Applied Systems Analysis, Laxenburg (Austria).
ENERGY FOR AGRICULTURE IN PAKISTAN
Muhammad Jameel May 1982 41 p refs
(IIASA-RR-82-20; ISBN-3-7045-0040-2) Copyright. Avail: Issuing Activity

The energy implications of different farm mechanization and macronutrient supply scenarios were examined. Results show that up to the year 2000, fertilizer production and irrigation-drainage account for 45 % and 40 %, respectively, of total energy input to agriculture. Tractors, threshers, and pesticides share the rest. Author (ESA)

N83-10500# Illinois Univ., Urbana. Dept. of Mechanical and Industrial Engineering.
AN EXPERIMENTAL INVESTIGATION OF CONVECTIVE LOSSES FROM SOLAR RECEIVERS Final Report
A. M. Clausing Aug. 1981 27 p refs Sponsored by DOE
(UILU-ENG-81-4003; ME-TN-81-9180-3) Avail: NTIS HC A03/MF A01

Convective energy loss from the receiver of a 10 mw solar thermal electric plant was determined. N.W.

N83-10501* National Aeronautics and Space Administration. Pasadena Office, Calif.
THERMAL REACTOR Patent
Harry Levin (JPL, California Inst. of Technology, Pasadena) and Larry B. Ford, inventors (to NASA) (JPL, California Inst. of Technology, Pasadena) Issued 29 Feb. 1980 9 p Filed 29 Feb. 1980 Supersedes N80-20338 (80 - 11, p 1389) Sponsored by NASA
(NASA-Case-NPO-14369-1; US-Patent-4,343,772; US-Patent-Appl-SN-126063; US-Patent-Class-422-200; US-Patent-Class-422-202; US-Patent-Class-422-224; US-Patent-Class-55-204) Avail: US Patent and Trademark Office CSCL 10A

A thermal reactor apparatus and method of pyrolyticaly decomposing silane gas into liquid silicon product and hydrogen by-product gas is disclosed. The thermal reactor has a reaction chamber which is heated well above the decomposition temperature of silane. An injector probe introduces the silane gas tangentially into the reaction chamber to form a first, outer, forwardly moving vortex containing the liquid silicon product and a second, inner, rewardly moving vortex containing the by-product hydrogen gas. The liquid silicon in the first outer vortex deposits onto the interior walls of the reaction chamber to form an equilibrium skull layer which flows to the forward or bottom end of the reaction chamber where it is removed. The by-product hydrogen gas in the second inner vortex is removed from the top or rear of the reaction chamber by a vortex finder. The injector probe which introduces the silane gas into the reaction chamber is continually cooled by a cooling jacket. Official Gazette of the U.S. Patent and Trademark Office

N83-10502*# TRW, Inc., Redondo Beach, Calif.
DEEP DISCHARGE RECONDITIONING AND SHORTED STORAGE OF BATTERIES Final Report
P. F. Ritterman May 1982 72 p refs
(Contract NAS3-21253)
(NASA-CR-167953; NAS 1.26:167953) Avail: NTIS HC A04/MF A01 CSCL 10C

The identification and measurement of hydrogen recombination in sealed nickel-cadium cells makes deep reconditioning on a battery basis safe and feasible. Deep reconditioning improves performance and increases life of nickel-cadium batteries in geosynchronous orbit applications. The hydrogen mechanism and supporting data are presented. Parameter cell design experiments are described which led to the definition of nickel-cadium cells capable of high rate overdischarge without detriment to specific energy. Nickel-cadium calls of identical optimum design were successfully cycled for 7 seasons in simulation of geosynchronous orbit at 75 percent depth-of-discharge with extensive midseason and end-of-season overdischarge at rates varying from C/20 to C/4. Destructive physical analysis and cycling data indicated no deterioration or the development of dangerous pressures as a result of the cycling with overdischarge. Author

N83-10503*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RESOURCE TARGETS FOR ADVANCED UNDERGROUND COAL

EXTRACTION SYSTEMS
John H. Hoag, David W. Whipple, Hamid Habib-Agahi, and Milton L. Lavin 1 Aug. 1982 128 p refs
(Contracts NAS7-100; DE-AI01-76ET-12548)
(NASA-CR-169429; JPL-PUB-82-15; NAS 1.26:169429; DOE/ET-12548/14) Avail: NTIS HC A07/MF A01 CSCL 08I

Resource targets appropriate for federal sponsorship of research and development of advanced underground coal mining systems are identified. A comprehensive examination of conventional and unconventional coals with particular attention to exceptionally thin and thick seams, steeply dipping beds, and multiple seam geometry was made. The results indicate that the resource of primary importance is flat lying bituminous coal of moderate thickness, under moderate cover, and located within the lower 48 states. Resources of secondary importance are the flat lying multiple seams and thin seams (especially those in Appalachia). Steeply dipping coals, abandoned pillars, and exceptionally thick western coals may be important in some regions of subregions, but the limited tonnage available places them in a position of tertiary importance. Author

N83-10504*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CORRELATION OF DESIGN WITH PERFORMANCE OF PRIMARY LITHIUM-SULFUR OXYHALIDE CELLS
H. A. Frank 1 Jun. 1982 142 p refs
(Contract NAS7-100)
(NASA-CR-169369; JPL-PUB-82-30; NAS 1.26:169369) Avail: NTIS HC A07/MF A01 CSCL 10C

Results and assessments of a focused literature review of primary lithium sulfur oxyhalide cells are presented. Major emphasis is placed on the effect of component materials and designs on performance (energy density and rate capability), safety, and storage life of these cells. This information is a reference guide for the design of high energy batteries for future use on NASA missions. Author

N83-10505*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FLAT PLATE SOLAR ARRAY PROJECT: PROCEEDINGS OF THE 20TH PROJECT INTEGRATION MEETING Progress Report, Nov. 1981 - Apr. 1982
R. R. McDonald Apr. 1982 543 p Meeting held at Pasadena, Calif., 21-22 Apr. 1981
(Contracts NAS7-100; DE-AI01-76ET-20356)
(NASA-CR-169370; DOE/JPL-1012-71; JPL-Pub-82-48; JPL-5101-209; NAS 1.26:169370; PR-20) Avail: NTIS HC A23/MF A01 CSCL 10B

Progress made by the Flat-Plate Solar Array Project during the period November 1981 to April 1982 is reported. Project analysis and integration, technology research in silicon material, large-area silicon sheet and environmental isolation, cell and module formation, engineering sciences, and module performance and failure analysis are covered. For individual titles, see N83-10506 through N83-10524.

N83-10506*# Department of Energy, Washington, D. C.
NATIONAL PHOTOVOLTAIC PROGRAM
M. Prince *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 55-60 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Department of Energy budget plans for 1982 are presented including general funding levels and key program achievements. Activities that are cost-shared with industry are summarized and cell efficiency improvements with time and industry accomplishments are discussed. J.M.S.

N83-10507*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
FSAS FUTURE ROLE
W. T. Callaghan *In its* Flat Plat Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 61-65 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The latest thinking about how the Flat-Plate Solar Array Project (FSA), will redirect activities away from recent product-oriented technology development efforts and toward longer-term research on technical problems that could limit future large-scale use of photovoltaics is addressed. With the emphasis on research, the Project is now organizing a series of workshops addressing the key basic technological questions by specific topic. Intervals between Project Integration Meetings are being extended because there are fewer contracts within ESA and because work under those contracts has been attenuated. J.M.S.

N83-10508*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
UNION CARBIDE CORP. POLYSILICON STATUS AND PLANS
M. H. Leipold *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 67-69 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The status of polysilicon activities is summarized highlighted by moving the silane portion of the experimental process system development unit (EPSDU) to Washougal, Washington. The completion and operation of the silane EPSDU, is discussed along with research on the silane-to-silicon deposition process. Progress on the dichlorosilane process is also reported. J.M.S.

N83-10509*# Kayex Corp., Rochester, N. Y.
ADVANCED CZOHCRALSKI INGOT GROWTH
R. L. Lane *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 71-98 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

A summary of advanced Cz ingot-growth activities is presented. Five ingots (totalling 150 kg) were grown from one crucible by use of chunk silicon replenishment between ingot pulls. The cost of the ingot growth was reduced from $80/kg (conventional Cz growth) to $20/kg. Further improvements can be made by achieving a better understanding of crystalline silicon growth and the influence on growth of contaminants from the atmosphere and/or the crucible. This should lead to a higher percentage of monocrystalline growth and possible increased growth rates. J.M.S.

N83-10510*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
BLOCK 5 MODULE DESIGN SUMMARY
L. D. Runkle *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 99-103 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The Flat Plate Solar Array Block 5 Module design efforts of six manufacturers are summarized. Residential designs and module designs for intermediate-load applications are described. It is planned that a few prototype modules of each design will be fabricated. The modules incorporate advanced concepts, are larger than earlier ones and have high power output. J.M.S.

N83-10511*# Sandia Labs., Albuquerque, N. Mex.
CENTRAL-STATION APPLICATIONS: SYSTEM AND SUBSYSTEM RESEARCH ACTIVITIES
G. J. Jones *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 105-111 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The results of a number of photovoltaic central power-station studies are summarized. Analysis based upon vendor quotes and construction contractor bids indicate that $50/sq m for area related costs for flat-plate arrays is achievable. Electrical design tradeoffs for multimegawatt systems are considered. The values of photovoltaic central-station plants for various regions are determined from an energy scenario effects study. J.M.S.

N83-10512*# Aerospace Corp., El Segundo, Calif.
PV LARGE SYSTEMS PROJECT
S. L. Leonard *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 113-122 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Near term photovoltaic central-station markets are analyzed. Cost effectiveness of photovoltaic plants is determined in terms of reduction of oil consumption. The breakeven photovoltaic system cost vs oil-steam power generation is given. The value of photovoltaic power plants in Southern California and in Los Angelos is given in terms of fuel savings and capacity value. The potential value of third party financing, facilitated by Federal and state tax incentives is analyzed. J.M.S.

N83-10513*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SACREMENTO MUNICIPAL UTILITY DISTRICT 100-MW SUB e PHOTOVOLTAIC PLANT
R. V. Powell *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 123-124 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10B

A status report on plans for the Sacramento Municipal Utility District (SMUD) 1-MW photovoltaic power plant is presented. DOE, the California Energy Commission, and SMUD will fund the project cooperatively. Emphasis is placed on the details of the government contract/cooperation agreement. J.M.S.

N83-10514*# Spectrolab, Inc., Sylmar, Calif.
PV HISTORY: LESSONS FOR THE FUTURE
E. L. Ralph *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 131-135 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

A history of terrestrial photovoltaics is presented indicating that the photovoltaic poential was well perceived and a good technology developent plan was formulated and implemented. Major accomplishments of the technology plan are highlighted. Research objectives and research needs for the future are outlined. J.M.S.

N83-10515*# Lincoln Lab., Mass. Inst. of Tech., Lexington.
ROOFTOP APPLICATIONS
E. Kern *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 147-150 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Research on residential photovoltaic power systems based upon the experience of MIT-LL in implementing the DOE Residential Demonstration Project, especially the Northeast Residential Experiment Station (NE RES) is discussed. There is an immediate need for improved power-conditioner operational and reliability capabilities. Continuing evaluation of photovoltaic power systems is required to verify long-term performance, reliability, and utility interface effects. In the long term, the price of photovoltaic power systems must decrease, especially of modules. J.M.S.

N83-10516*# Mobil Tyco Solar Energy Corp., Waltham, Mass.
PHOTOVOLTAIC RESEARCH NEEDS INDUSTRY PERSPECTIVE
K. V. Ravi *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 155-160 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

An industries perspective of photovoltaic research needs is presented. Objectives and features of industry needs are discussed for the materials, devices, processes, and reliability research categories. J.M.S.

N83-10517*# Pennsylvania Univ., Philadelphia.
RESEARCH POSSIBILITIES? NO! NEEDS FOR RESEARCH TO MAKE PV SOLAR ENERGY UTILIZATION BROADLY COMPETITIVE
M. Wolf *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 161-169 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The historical progression of efficiency improvements, cost reductions, and performance improvements in modules and photovoltaic systems are described. The potential for future improvements in photovoltaic device efficiencies and cost reductions continues as device concepts, designs, processes, and automated production compabilities mature. Additional step-function improvements can be made as today's simpler devices are replaced by more sophicated devices. J.M.S.

N83-10518*# Midwest Research Inst., Golden, Colo.
EVALUATION OF ADVANCED R AND D TOPICS IN PHOTOVOLTAICS
T. Surek *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 171-178 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

An evaluation of advanced research and development topics in photovoltaic that is summarized. The intent was to develop priorities in a list of advanced research and development activities. Thirty-five activities in 10 major categories were evaluated by their contributions to basic scientific advances, potential impact on further technology development by private industry, and priorities for federal advanced research and development funding. J.M.S.

N83-10519*# Union Carbide Corp., Tonawanda, N.Y.
FLAT-PLATE COLLECTOR RESEARCH AREA: SILICON MATERIAL TASK
R. Lutwack *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 179-226 Prepared in cooperation with Solarelectronics, Inc., Hemlock Semiconductor Corp., Mich., and JPL (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Silane decomposition in a fluidized-bed reactor (FBR) process development unit (PDU) to make semiconductor-grade Si is reviewed. The PDU was modified by installation of a new heating system to provide the required temperature profile and better control, and testing was resumed. A process for making trichlorosilane by the hydrochlorination of metallurgical-grade Si and silicon tetrachloride is reported. Fabrication and installation of the test system employing a new 2-in.-dia reactor was completed. A process that converts trichlorosilane to dichlorosilane (DCS), which is reduced by hydrogen to make Si by a chemical vapor deposition step in a Siemens-type reactor is described. Testing of the DCS PDU integraed with Si deposition reactors continued. Experiments in a 2-in.-dia reactor to define the operating window and to investigate the Si deposition kinetics were completed. Author

N83-10520*# Westinghouse Electric Corp., Pittsburgh, Pa.
LARGE-AREA SILICON SHEET TASK
A. D. Morrison *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 227-320 Prepared in cooperation with Mobil Tyco Solar Energy Corp., Semix, Inc., Cornell Univ., Ithaca, NY, Illinois Univ., Chicago and Applied Solar Energy Corp. (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

A set of computer models was used to define a growth system configuration that was then built and used to grow web with lower thermally generated stress. Aspects of research in the edge-defined film-fed growth (EFG) method of making Si ribbon are reported. A technique was developed to determine base resistivity and carrier lifetime in semicrystalline wafers. Automated growth of 150 kg of 15 cm-dia ingot material per crucible is reviewed. Scanning transmisson electron microscopy (STEM) and microprobe investigations of processed EFG ribbon are reported. The chemical composition of the large precipitates was studied. The structural arrangement and the electrical activity of distentions or close to the central twin plane in processed material were studied. The electrical and structural properties of grain boundaries in silicon

are discussed. Temperature-dependence measurements of zero-bias conductance, a photoconductivity technique, and deep-level transient spectroscopy (DLTS) were developed. A grooving and staining technique, secondary ion mass spectroscopy, and EBIC measurements in scanning electron microscopy were used to study enhanced diffusion of phosphorus at grain boundaries in polycrystaline silicon. The fundamental mechanisms of abrasion and wear and the deformation of Si by a diamond in various fluid environments are described. The efficiency of solar cells made from EFG ribbon and Semix Inc. material is reported. Author

N83-10521*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ENVIRONMENTAL ISOLATION TASK
C. D. Coulbert *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 321-361 Prepared in cooperation with Springborn Labs., Inc. and Spectrolab, Inc., Sylmar, Calif. (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

The failure-analysis process was organized into a more specific set of long-term degradation steps so that material property change can be differentiated from module damage and module failure. Increasing module performance and life are discussed. A polymeric aging computer model is discussed. Early detection of polymer surface reactions due to aging is reported. Author

N83-10522*# Ross (Bernd) Associates, San Diego, Calif.
CELL AND MODULE FORMATION RESEARCH AREA
D. B. Bickler *In* JPL Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 363-426 Prepared in cooperation with JPL, Spectrolab, Inc., Sylmar, Calif., Photowatt International, Inc., Spire Corp., Solarex Corp., Westinghouse Electric Corp., Pittsburgh, and Pennsylvania Univ., Philadelphia (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Metallization is discussed. The influence of hydrogen on the firing of base-metal pastes in reducing atmospheres is reported. A method for optimization of metallization patterns is presented. A process sequence involving an AR coating and thick-film metallization system capable of penetrating the AR coating during firing is reported. Design and construction of the NMA implantation machine is reported. Implanted back-surface fields and NMA primary (front) junctions are discussed. The use of glass beads, a wave-soldering device, and ion milling is reported. Processing through the module fabrication and environmental testing of its design are reported. Metallization patterns by mathematical optimization are assessed. Author

N83-10523*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
ENGINEERING SCIENCES AREA AND MODULE PERFORMANCE AND FAILURE ANALYSIS AREA
R. G. Ross, Jr. and L. D. Runkle *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 427-528 Prepared in cooperation with Lincoln Lab., Lexington (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

Photovoltaic-array/power-conditioner interface studies are updated. An experiment conducted to evaluate different operating-point strategies, such as constant voltage and pilot cells, and to determine array energy losses when the array is operated off the maximum power points is described. Initial results over a test period of three and a half weeks showed a 2% energy loss when the array is operated at a fixed voltage. Degraded-array studies conducted at NE RES that used a range of simulated common types of degraded I-V curves are reviewed. The instrumentation installed at the JPL field-test site to obtain the irradiance data was described. Experiments using an optical filter to adjust the spectral irradiance of the large-area pulsed solar simulator (LAPSS) to AM1.5 are described. Residential-array research activity is reviewed. Voltage isolation test results are described. Experiments performed on one type of module to determine the relationship between leakage current and temperature are reviewed. An encapsulated-cell testing approach is explained. The test program, data reduction methods, and initial results of long-duration module testing are described. Author

N83-10524*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PROJECT ANALYSIS AND INTEGRATION AREA
R. W. Aster and G. Fox *In its* Flat Plate Solar Array Proj.: Proc. of the 20th Proj. Integration Meeting Apr. 1982 p 529-535 (For primary document see N83-10505 01-44)
Avail: NTIS HC A23/MF A01 CSCL 10A

A simulation program that investigates the relationship between manpower requirements and equipment availability in the presence of scheduled and unscheduled maintenance is presented. A method for optimization of metallization patterns is presented. Author

N83-10525*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PARABOLIC DISH SOLAR THERMAL POWER ANNUAL PROGRAM REVIEW, PROCEEDINGS
John W. Lucas 15 Jul. 1982 347 p refs Conf. held in Atlanta, 8-10 Dec. 1981
(Contracts NAS7-100; DE-AT04-81AL-16228)
(NASA-CR-169365; JPL-Pub-82-66; JPL-5105-118; DOE/JPL-106052; NAS 1.26:169365) Avail: NTIS HC A15/MF A01 CSCL 10B

The results of activities of the parabolic dish technology and applications development element of DOE's Solar Thermal Energy System Program are presented. Topics include the development and testing of concentrators, receivers, and power conversion units; system design and development for engineering experiments; economic analysis and marketing assessment; and advanced development activities. A panel discussion concerning industrial support sector requirements is also documented. For individual titles, see N83-10526 through N83-10550.

N83-10526*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
DEVELOPMENT STATUS OF THE PDC-1 PARABOLIC DISH CONCENTRATOR
T. Thostesen, I. F. Soczak (Ford Aerospace and Communications Corp., Newport Beach, Calif.), and Robert L. Pons (Ford Aerospace and Communications Corp., Newport Beach, Calif.) *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 3-13 refs (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The status of development of the 12 m diameter parabolic dish concentrator which is planned for use with the Small Community Solar Thermal Power System. The PDC-1 unit features the use of plastic reflector film bonded to structural plastic gores supported by front-bracing steel ribs. An elevation-over-azimuth mount arrangement is employed, with a conventional wheel-and-track arrangement; outboard trunnions permit the dish to be stored in the face down position, with the added advantage of easy access to the power conversion assembly. The control system is comprised of a central computer (LSI 1123), a manual control panel, a concentrator control unit, two motor controllers, a Sun sensor, and two angular position resolvers. The system is designed for the simultaneous control of several concentrators. The optical testing of reflective panels is described. M.G.

N83-10527*# Acurex Corp., Mountain View, Calif.
ACUREX PARABOLIC DISH CONCENTRATOR (PDC-2)
Peter Overly and Roger Bedard *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 15-20 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The design approach, rationale for the selected configuration, and the development status of a cost effective point-focus solar concentrator are discussed. The low-cost concentrator reflective surface design is based on the use of a thin, backsilvered mirror glass reflector bonded to a molded structural plastic substrate. The foundation, support, and drive subassembles are described.

A hybrid, two-axis, Sun tracking control system based on microprocessor technology was selected. Coarse synthetic tracking is achieved through a microcomputer-based control system to calculate Sun position for transient periods of cloud cover as well as sundown and sunrise positioning. Accurate active tracking is achieved by two-axis optical sensors. Results of the reflective panel demonstration tests investigating slope error, hail impact survivability, temperature/humidity cycling, longitudinal strength/bending stiffness, and torsional stiffness are discussed. M.G.

N83-10528*# Power Kinetics, Inc., Troy, N.Y.
THE PKI COLLECTOR
Mark P. Rice *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 25-34 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The design and manufacturing of a solar thermal collector is discussed. The collector has three primary subsystems: concentrator, receiver/fluid loop, and controls. Identical curved reflective columns are utilized in a faceted Fresnel design to support 864 one foot square flat inexpensive second-surface, silvered glass mirrors. The columns are ganged together and rotated through their centers of gravity to provide elevation tracking. The concentrator is supported by a lightweight spaceframe structure which distributes all wind and gravity loads to the base supports. The base of the structure is a track which rotates on wheels mounted on concrete piers. A parallel tube steel heat exchanger is mounted at the concentrator focal area in a well insulated, galvanized steel housing. Two rows of vertical close-packed, staggered tubes connect a mud header and a steam header. Automatic two axis tracking and operational control is provided with a microprocessor based package. Concentrator-mounted shadowbands are the basis for active tracking. A software program provides azimuthal tracking during cloudy periods. M.G.

N83-10529*# Boeing Engineering and Construction, Seattle, Wash.
THIN FILM CONCENTRATOR PANEL DEVELOPMENT
Donald K. Zimmerman *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 25-34 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The development and testing of a rigid panel concept that utilizes a thin film reflective surface for application to a low-cost point-focusing solar concentrator is discussed. It is shown that a thin film reflective surface is acceptable for use on solar concentrators, including 1500 F applications. Additionally, it is shown that a formed steel sheet substrate is a good choice for concentrator panels. The panel has good optical properties, acceptable forming tolerances, environmentally resistant substrate and stiffeners, and adaptability to low to mass production rates. Computer simulations of the concentrator optics were run using the selected reflector panel design. Experimentally determined values for reflector surface specularity and reflectivity along with dimensional data were used in the analysis. The simulations provided intercept factor and net energy into the aperture as a function of aperture size for different surface errors and pointing errors. Point source and Sun source optical tests were also performed. M.G.

N83-10530*# E-Systems, Inc., Dallas, Tex. Energy Technology Center.
A TRANSMITTANCE-OPTIMIZED, POINT-FOCUS FRESNEL LENS SOLAR CONCENTRATOR
Mark J. ONeill, Vernon R. Goldberg, and D. B. Muzzy *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 35-47 refs (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The development of a point-focus Fresnel lens solar concentrator for high-temperature solar thermal energy system applications is discussed. The concentrator utilizes a transmittance-optimized, short-focal-length, dome-shaped refractive Fresnel lens as the optical element. This concentrator combines both good optical performance and a large tolerance for manufacturing, deflection, and tracking errors. The conceptual design of an 11-meter diameter concentrator which should provide an overall collector efficiency of about 70% at an 815 C (1500 F) receiver operating temperature and a 1500X geometric concentration ratio (lens aperture area/receiver aperture area) was completed. Results of optical and thermal analyses of the collector, a discussion of manufacturing methods for making the large lens, and an update on the current status and future plans of the development program are included. M.G.

N83-10531*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
THE SMALL COMMUNITY SOLAR THERMAL POWER EXPERIMENT
Taras Kiceniuk *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 49-52 Previously announced as N81-30544 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The objectives and current status of the Small Community Solar Thermal Power Experiment are discussed. The adjustments in programs goals made in response to the changing emphasis in the area of solar energy in national policy are addressed. Planned frabication and testing activities for the test bed concentrator, power conversion assembly, and control system are outlined. M.G.

N83-10532*# Ford Aerospace and Communications Corp., Newport Beach, Calif. Aeronutronic Div.
DEVELOPMENT STATUS OF THE SMALL COMMUNITY SOLAR POWER SYSTEM
Robert L. Pons *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 53-99 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The development status and test results for the Small Community Solar Thermal Power Experiment are presented. Activities on the phase 2 power module development effoet are presented with emphasis on the receiver, the plant control subsystem, and the energy transport subsystem. The components include a single prototype power module consisting of a parabolic dish concentrator, a power conversion assembly (PCA), and a multiple-module plant control subsystem. The PCA consists of a cavity receiver coupled to an organic Rankine cycle engine-alternator unit defined as the power conversion subsystem; the PCA is mounted at the focus of a parabolic dish concentrator. At a solar insolation of 100 W/sq m and ambient temperature of 28 C (82 F), the power module produces approximately 20 kW of 3-phase, 3 kHz ac power, depending on the concentrator employed. A ground-mounted rectifier to the central collection site where it is supplied directly to the common dc bus which collects the power from all modules in the plant. M.G.

N83-10533*# Barber-Nichols Engineering Co., Arvada, Colo.
ORGANIC RANKINE POWER CONVERSION SUBSYSTEM DEVELOPMENT FOR THE SMALL COMMUNITY SOLAR THERMAL POWER SYSTEM
Robert E. Barber and Frank P. Boda (Ford Aerospace and Communications Corp., Newport Beach, Calif.) *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 101-113 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The development and preliminary test results for an air-cooled, hermetically sealed 20 kW sub E organic Rankine cycle engine/alternator unit for use with point focussing distributed receiver solar thermal power system. A 750 F toluene is the working fluid and the system features a high speed, single-stage axial flow turbine direct-coupled to a permanent magnet alternator. Good performance was achieved with the unit in preliminary tests. M.G.

N83-10534*# Applied Concepts Corp., Reston, Va.
VERIFICATION TESTING OF THE PKI COLLECTOR AT SANDIA NATIONAL LABORATORIES, ALBUQUERQUE, NEW MEXICO
J. Scott Hauger and Stan L. Pond *In* JPL Parabolic Dish Solar

Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 115-118 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

Verification testing of a solar collector was undertaken prior to its operation as part of an industrial process heat plant at Capitol Concrete Products in Topeka, Kansas. Testing was performed at a control plant installed at Sandia National Laboratory, Albuquerque, New Mexico (SNLA). Early results show that plant performance is even better than anticipated and far in excess of test criteria. Overall plant efficiencies of 65 to 80 percent were typical during hours of good insolation. A number of flaws and imperfections were detected during operability testing, the most important being a problem in elevation drive alignment due to a manufacturing error. All problems were corrected as they occurred and the plant, with over 40 hours of operation, is currently continuing operability testing in a wholly-automatic mode. R.J.F

N83-10535*# Applied Concepts Corp., Reston, Va.
PKI SOLAR THERMAL PLANT EVALUATION AT CAPITOL CONCRETE PRODUCTS, TOPEKA, KANSAS
J. Scott Hauger and D. N. Borton (Power Kinetics, Inc.) *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 119-121 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

A system feasibility test to determine the technical and operational feasibility of using a solar collector to provide industrial process heat is discussed. The test is of a solar collector system in an industrial test bed plant at Capitol Concrete Products in Topeka, Kansas, with an experiment control at Sandia National Laboratories, Albuquerque. Plant evaluation will occur during a year-long period of industrial utilization. It will include performance testing, operability testing, and system failure analysis. Performance data will be recorded by a data acquisition system. User, community, and environmental inputs will be recorded in logs, journals, and files. Plant installation, start-up, and evaluation, are anticipated for late November, 1981. R.J.F.

N83-10536*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RECENT TESTS ON THE CARTER SMALL RECIPROCATING STEAM ENGINES
Taras Kiceniuk and W. Wingenbach *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 123-145 refs (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The Jay Carter Enterprises (JCE) Paratransit Vehicle steam engine was tested over a range of conditions which might be experienced by the power converter subsystem of the Small Community Solar Thermal Power Experiment. Some difficulties were encountered getting the engine ready for testing. These difficulties were related to the five year dormancy of the entire system and to incomplete development work that had been going on at the time of cessation of steam engine work at JCE. Other difficulties were related to the fact that the particular expander being tested never ran before and possessed some manufacturing defects. Nevertheless, the engine was operated successfully and results of testing do verify results of computer simulations of the engine in regard to the effect of temperature and power level variations. Engine efficiency was good but generally lower than expected and performance dropped as testing continued. The effect of change in expansion ratio was not demonstrated because of deterioration in engine performance. Post-test inspection revealed numerous correctable defects. R.J.F.

N83-10537*# Mechanical Technology, Inc., Latham, N. Y.
A 400-kWe HIGH-EFFICIENCY STEAM TURBINE FOR INDUSTRIAL COGENERATION
Herman M. Leibowitz *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 147-177 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

An advanced state-of-the-art steam turbine-generator developed to serve as the power conversion subsystem for the Department of Energy's Sandia National Laboratories' Solar Total-Energy Project (STEP) is described. The turbine-generator, which is designed to provide 400-kW of net electrical power, represents the largest turbine-generator built specifically for commercial solar-powered cogeneration. The controls for the turbine-generator incorporate a multiple, partial-arc entry to provide efficient off-design performance, as well as an extraction control scheme to permit extraction flow regulation while maintaining 110-spsig pressure. Normal turbine operation is achieved while synchronized to a local utility and in a stand-alone mode. In both cases, the turbine-generator features automatic load control as well as remote start-up and shutdown capability. Tests totaling 200 hours were conducted to confirm the integrity of the turbine's mechanical structure and control function. Performance tests resulted in a measured inlet throttle flow of 8,450 pounds per hour, which was near design conditions. R.J.F.

N83-10538*# KB United Stirling AB & Co., Malmoe (Sweden).
MODIFICATIONS AND TESTING OF A 4-95 STIRLING ENGINE FOR SOLAR APPLICATIONS
H. G. Nelving and W. H. Percival (United Stirling, Inc.) *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 179-189 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The modifications and testing of a standard Stirling engine, required for connection to a 25 kW induction alternator, for use with a solar thermal parabolic dish electric module is described. Power was absorbed by a GE induction alternator connected to the utility grid. Also included are the results from recent testing of another solar engine at the DOE-Georgia Tech solar site. It was done in parallel with the testing at Edwards for the purpose of comparing performance of two solar-only receivers, which were based on the standard 4-95 involute heat exchanger. R.J.F.

N83-10539*# Advanco Corp., El Segundo, Calif.
DISH STIRLING SYSTEM INTEGRATION AND TEST PROGRESS REPORT
Richard A. Haglund *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 191-200 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The integration and check-out of a complete Dish Solar Stirling Thermal Power System is described. The preliminary results of the tests conducted thus far are presented. The results are very encouraging and show promise of high performance and efficiency. The outstanding performance and durability of the 4-95 Stirling engine was the highlight of this 6 month integration and test activity. Exposure to severe heat, dust, sand and wind during the summer months and heavy rains, high winds, including sand storms and freezing cold in recent months did affected the engine or the receiver in any noticable manner. R.J.F.

N83-10540*# Advanco Corp., El Segundo, Calif.
COMMERCIALIZATION OF PARABOLIC DISH SYSTEMS
Byron Washom *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 201-205 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The impact of recent federal tax and regulatory legisiation on the commercialization of parabolic solar reflector technology is assessed. Specific areas in need of technical or economic improvement are noted. R.J.F.

N83-10541*# Messerschmitt-Boelkow-Blohm G.m.b.H., Munich (West Germany).
A POINT FOCUSING COLLECTOR FOR AN INTEGRATED WATER/POWER COMPLEX
Helmut Zewen, G. Schmidt, and S. Moustafa (Kuwait Inst. for Scientific Research) *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 207-223 refs Translation was announced as N82-23149 (For primary document see

N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The utilization potential of the point focusing parabolic dish is identified. Its main design parameters are summarized. Performance tests and the utilization of the collector as primary energy source in a food-water-power complex are described. Process heat, heat storage, heat transfer, and cogeneration are discussed. R.J.F.

N83-10542*# Centre National de la Recherche Scientifique, Marseilles (France). Dept. d'Heliophysique.
THE FRENCH THERMO-HELIO-ELECTRICITY-KW PARABOLIC DISH PROGRAM
Michel Audibert and George Peri *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 225-231 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The testing and development of parabolic dish solar thermal power plants to produce, thermal mechanical, or electrical energy are discussed. The design, construction, and experiments of prototype collectors to prove the feasibility of such collectors is described. R.J.F.

N83-10543*# AiResearch Mfg. Co., Torrance, Calif.
HIGH-TEMPERATURE CERAMIC HEAT EXCHANGER ELEMENT FOR A SOLAR THERMAL RECEIVER
Hal J. Strumpf, David M. Kotchick, and Murray G. Coombs *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 233-246 refs (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

A study was performed by AiResearch Manufacturing Company, a division of The Garrett Corporation, on the development a high-temperature ceramic heat exchanger element to be integrated into a solar receiver producing heated air. A number of conceptual designs were developed for heat exchanger elements of differing configuration. These were evaluated with respect to thermal performance, pressure drop, structural integrity, and fabricability. The final design selection identified a finned ceramic shell as the most favorable concept. The shell is surrounded by a larger metallic shell. The flanges of the two shells are sealed to provide a leak-tight pressure vessel. The ceramic shell is to be fabricated by an innovative combination of slip casting the receiver walls and precision casting the heat transfer finned plates. The fins are bonded to the shell during firing. The unit is sized to produce 2150 F ar at 2.7 atm pressure, with a pressure drop of about 2 percent of the inlet pressure. This size is compatible with a solar collector providing a receiver input of 85 kw(th). Fabrication of a one-half scale demonstrator ceramic receiver has been completed. B.W.

N83-10544*# Sanders Associates, Inc., Nashua, N. H.
CERAMIC HIGH TEMPERATURE RECEIVER DESIGN AND TESTS
S. Bear Davis *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 247-255 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The High Temperature Solar Thermal Receiver, which was tested a Edwards AFB, CA during the winter of 1980-1981, evolved from technologies developed over a five year period of work. This receiver was tested at the Army Solar Furnace at White Sands, NM in 1976. The receiver, was tested successfully at 1768 deg F and showed thermal efficiencies of 85%. The results were sufficiently promising to lead ERDA to fund our development and test of a 250 kW receiver to measure the efficiency of an open cavity receiver atop a central tower of a heliostat field. This receiver was required to be design scalable to 10, 50, and 100 MW-electric sizes to show applicability to central power tower receivers. That receiver employed rectagular silicon carbide panels and vertical stanchions to achieve scalability. The construction was shown to be fully scalable; and the receiver was operated at temperatures up to 2000 deg F to achieve the performance goals of the experiment during tests at the GIT advanced components test facility during the fall of 1978. B.W.

N83-10545*# Garrett Turbine Engine Co., Phoenix, Ariz.
GARRETT SOLAR BRAYTON ENGINE/GENERATOR STATUS
Bruce Anson *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 257-282 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The solar advanced gas turbine (SAGT-1) is being developed by the Garrett Turbine Engine Company, for use in a Brayton cycle power conversion module. The engine is derived from the advanced gas turbine (AGT101) now being developd by Garrett and Ford Motor Company for automotive use. The SAGT Program is presently funded for the design, abrication and test of one engine at Garrett's Phoenix facility. The engine when mated with a solar receiver is called a power conversion module (PCU). The PCU is scheduled to be tested on JPL's test bed concentrator under a follow on phase of the program. Approximately 20 kw of electrical power will be generated. B.W.

N83-10546*# AiResearch Mfg. Co., Los Angeles, Calif.
APPLICATION OF THE SUBATMOSPHERIC ENGINE TO SOLAR THERMAL POWER
In JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 283-293 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

The development of a natural gas-fired Brayton engine is discussed. It is intended to be the prime mover for a 10-ton commercial heat pump. This engine has many attractive features that make it an ideal candidate for solar thermal-power generation applications. The unique feature of this engine is its subatmospheric mode of operation. It operates between atmospheric pressure and a partial vacuum. This means that heat is added to the cycle at atmospheric pressure; this permits the receiver to be unpressurized, greatly simplifying its design and cost. B.W.

N83-10547*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
POTENTIAL BENEFITS FROM A SUCCESSFUL SOLAR THERMAL PROGRAM
K. L. Terasawa and W. R. Gates *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 295-318 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

Solar energy systems were investigated which complement nuclear and coal technologies as a means of reducing the U.S. dependence on imported petroleum. Solar Thermal Energy Systems (STES) represents an important category of solar energy technologies. STES can be utilized in a broad range of applications servicing a variety of economic sectors, and they can be deployed in both near-term and long-term markets. The net present value of the energy cost savings attributable to electric utility and IPH applications of STES were estimated for a variety of future energy cost scenarios and levels of R&D success. This analysis indicated that the expected net benefits of developing an STES option are significantly greater than the expected costs of completing the required R&D. In addition, transportable fuels and chemical feedstocks represent a substantial future potential market for STES. Due to the basic nature of this R&D activity, however, it is currently impossible to estimate the value of STES in these markets. Despite this fact, private investment in STES R&D is not anticipated due to the high level of uncertainty characterizing the expected payoffs. B.W.

N83-10548*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
CONFIGURATION SELECTION STUDY FOR ISOLATED LOADS USING PARABOLIC DISH MODULES
W. Revere, J. Bowyer, T. Fujita, and H. Awaya *In its* Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 319-328 refs Previously announced as A82-18223 (For primary

document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10B

A configuration tradeoff study was conducted to determine optimum solar thermal parabolic dish power systems for isolated load applications. The specific application of an essentially constant power demand as required for MX missile shelters is treated. Supplying a continuous level of power with high reliability is shown to require a power system comprisng modular parabolic dish power units where the heat engines of the modular power units can be driven by fossil fuels as well as solar-derived heat. Since constraints on reliability result in the provision of a power generating capability that exceeds the constant demand level, efficient utilization of the power system requires battery storage. Tradeoffs regarding the optimum size of storage are investigated as a function of the number of power modules and the cost of the fossil fuel. B.W.

N83-10549*# Solar Steam, Inc., Fox Island, Wash.
AN ECONOMIC EVALUATION OF SOLAR ENERGY
Doug Wood *In* JPL Parabolic Dish Solar Thermal Ann. Program Rev., Proc. 15 Jul. 1982 p 329-338 Previously announced as A78-10615 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

The economic advantages of solar dish collectors are evaluated and compared with other energy systems. Labor, inflation and energy deregulation are considered. B.W.

N83-10550*# Advanco Corp., El Segundo, Calif.
PANEL DISCUSSIONS: INDUSTRIAL SUPPORT SECTOR REQUIREMENTS
Byron Washom *In* JPL Parabolic Dish Solar Thermal Power Ann. Program Rev., Proc. 15 Jul. 1982 p 339-353 (For primary document see N83-10525 01-44)
Avail: NTIS HC A15/MF A01 CSCL 10A

Industrial support was the subject of a panel discussion on solar energy technology. Members of various energy-related businesses and agencies were present. Topics covered include: (1) solar collectors; (2) solar energy policy; (3) government/industry relations; and (4) economic factors which influence the use of solar energy. B.W.

N83-10551*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
SOLAR THERMAL TECHNOLOGIES BENEFITS ASSESSMENT: OBJECTIVES, METHODOLOGIES AND RESULTS FOR 1981
W. R. Gates Jul. 1982 45 p refs
(Contracts NAS7-100; DE-AM04-80AL-13137; JPL Proj. 5106-23) (NASA-CR-169373; DOE/JPL-1060-55; JPL-PUB-82-70; NAS 1.26:169373) Avail: NTIS HC A03/MF A01 CSCL 10A

The economic and social benefits of developing cost competitive solar thermal technologies (STT) were assessed. The analysis was restricted to STT in electric applications for 16 high insolation/high energy price states. Three fuel price scenarios and three 1990 STT system costs were considered, reflecting uncertainty over fuel prices and STT cost projections. After considering the numerous benefits of introducing STT into the energy market, three primary benefits were identified and evaluated: (1) direct energy cost savings were estimated to range from zero to $50 billion; (2) oil imports may be reduced by up to 9 percent, improving national security; and (3) significant environmental benefits can be realized in air basins where electric power plant emissions create substantial air pollution problems. STT research and development was found to be unacceptably risky for private industry in the absence of federal support. The normal risks associated with investments in research and development are accentuated because the OPEC cartel can artificially manipulate oil prices and undercut the growth of alternative energy sources. S.L.

N83-10552*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
USER HANDBOOK FOR BLOCK IV SILICON SOLAR CELL MODULES
M. I. Smokler 1 Sep. 1982 63 p refs
(Contract NAS7-100)
(NASA-CR-169431; DOE/JPL-1012-75; JPL-PUB-82-73; NAS 1.26:169431) Avail: NTIS HC A04/MF A01 CSCL 10A

The essential electrical and mechanical characteristics of block 4 photovoltaic solar cell modules are described. Such module characteristics as power output, nominal operating voltage, current-voltage characteristics, nominal operating cell temperature, and dimensions are tabulated. The limits of the environmental and other stress tests to which the modules are subjected are briefly described. M.G.

N83-10553*# Jet Propulsion Lab., California Inst. of Tech., Pasadena.
PHOTOVOLTAIC MODULE ENCAPSULATION DESIGN AND MATERIALS SELECTION, VOLUME 1, ABRIDGED
E. Cuddihy 1 Sep. 1982 40 p refs
(Contracts NAS7-100; DE-AI01-76ET-20356; JPL Proj. 5101-216) (NASA-CR-169372; DOE/JPL-1012-77-Vol-1; JPL-PUB-82-81-Vol-1; NAS 1.26:169372) Avail: NTIS HC A03/MF A01 CSCL 10A

A summary version of Volume 1, presenting the basic encapsulation systems, their purposes and requirements, and the characteristics of the most promising candidate systems and materials, as identified and evaluated by the Flat-Plate Solar Array Project is presented. In this summary version considerable detail and much supporting and experimental information has necessarily been omitted. A reader interested in references and literature citations, and in more detailed information on specific topics, should consult Reference 1, JPL Document No. 5101-177, JPL Publication 81-102, DOE/JPL-1012-60 (JPL), June 1, 1982. Author

N83-10554*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
THE EFFECT OF Ta_2O_5 ON THE INTERACTION BETWEEN SILICON AND ITS CONTACT METALLIZATION
V. G. Weizer 1982 10 p refs Presented at the 16th Photovoltaic Specialists Conf., San Diego, Calif., 23 Sep. 1982; sponsored by IEEE
(NASA-TM-82948; E-1354; NAS 1.15:82948) Avail: NTIS HC A02/MF A01 CSCL 10A

Evidence is presented showing that the presence of the commonly used antireflection coating material, Ta_2O_5, on the free surface of contact metallization can either suppress or enhance, depending on the system, the interaction that takes place at elevated temperatures between the metallization and the underlying silicon. The Ta_2O_5 layer is shown to suppress both the generation and the annihilation of vacancies at the metal free surface which are necessary to support metal-silicon interactions. It is also shown that the mechanical condition of the free metal surface has a significant effect on the passivating ability of the Ta_2O_5 layer. Author

N83-10555*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION OF ELECTRODE SHAPE AND NONDESTRUCTIVE EVALUATION METHOD FOR WELDED SOLAR CELL INTERCONNECTS
C. R. Baraona, S. J. Klima, T. J. Moore, W. E. Frey, and A. F. Forestieri Sep. 1982 14 p refs Presented at 16th Photovoltaic Specialists Conf., San Diego, Calif., 27-30 Sep. 1982; sponsored by IEEE
(NASA-TM-82966; E-1386; NAS 1.15:82966) Avail: NTIS HC A02/MF A01 CSCL 10A

Resistance welds of solar cell interconnect tabs were evaluated. Both copper-silver and silver-silver welds were made with various heat inputs and weld durations. Parallel gap and annular gap weld electrode designs were used. The welds were analyzed by light microscope, electron microprobe and scanning laser acoustic microscope. These analyses showed the size and shape of the weld, the relationship between the acoustic micrographs, the visible electrode footprint, and the effect of electrode misalignment. The effect of weld heat input on weld microstructure was also shown. Author

N83-10556*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBUSTION OF COAL GAS FUELS IN A STAGED COMBUSTOR
T. J. Rosfjord, J. B. McVey, R. A. Sederquist, and D. F. Schultz 1982 14 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982 Prepared in cooperation with United Technologies Research Center, East Hartford, Conn. and United Technologies Corp., South Windsor, Conn.
(Contracts DEN3-149; DE-AI01-77ET-13111)
(NASA-TM-82987; DOE/NASA/13111-12; E-1419; NAS 1.15:82987) Avail: NTIS HC A02/MF A01 CSCL 10B

Gaseous fuels produced from coal resources generally have heating values much lower than natural gas; the low heating value could result in unstable or inefficient combustion. Coal gas fuels may contain ammonia which if oxidized in an uncontrolled manner could result in unacceptable nitrogen oxide exhaust emission levels. Previous investigations indicate that staged, rich-lean combustion represents a desirable approach to achieve stable, efficient, low nitrogen oxide emission operation for coal-derived liquid fuels containg up to 0.8-wt pct nitrogen. An experimental program was conducted to determine whether this fuel tolerance can be extended to include coal-derived gaseous fuels. The results of tests with three nitrogen-free fuels having heating values of 100, 250, and 350 Btu/scf and a 250 Btu/scf heating value doped to contain 0.7 pct ammonia are presented. Author

N83-10557*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EVALUATION OF ADVANCED COMBUSTION CONCEPTS FOR DRY NO SUB X SUPPRESSION WITH COAL-DERIVED, GASEOUS FUELS
K. W. Beebe (GE, Schenectady, N.Y.), R. A. Symonds (GE, Schenectady, N.Y.), and J. J. Notardonato 1982 15 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982
(Contract DE-AI01-77ET-13111)
(NASA-TM-82985; DOE/NASA/13111-11; E-1417; NAS 1.15:82985) Avail: NTIS HC A02/MF A01 CSCL 10B

The emissions performance of a rich lean combustor (developed for liquid fuels) was determined for combustion of simulated coal gases ranging in heating value from 167 to 244 Btu/scf (7.0 to 10.3 MJ/NCM). The 244 Btu/scf gas is typical of the product gas from an oxygen blown gasifier, while the 167 Btu/scf gas is similar to that from an air blown gasifier. NOx performance of the rich lean combustor did not meet program goals with the 244 Btu/scf gas because of high thermal NOx, similar to levels expected from conventional lean burning combustors. The NOx emissions are attributed to inadequate fuel air mixing in the rich stage resulting from the design of the large central fuel nozzle delivering 71% of the total gas flow. NOx yield from ammonia injected into the fuel gas decreased rapidly with increasing ammonia level, and is projected to be less than 10% at NH3 levels of 0.5% or higher. NOx generation from NH3 is significant at ammonia concentrations significantly less than 0.5%. These levels may occur depending on fuel gas cleanup system design. CO emissions, combustion efficiency, smoke and other operational performance parameters were satisfactory. A test was completed with a catalytic combustor concept with petroleum distillate fuel. Reactor stage NOx emissions were low (1.4g NOx/kg fuel). CO emissions and combustion efficiency were satisfactory. Airflow split instabilities occurred which eventually led to test termination. S.L.

N83-10558*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
EXPECTED CYCLE LIFE VERSUS DEPTH OF DISCHARGE RELATIONSHIPS OF WELL BEHAVED SINGLE CELLS AND CELL STRINGS
Lawrence H. Thaller 1982 17 p refs Presented at the 162d Meeting of the Electrochem. Soc., Detroit, 17-22 Oct. 1982
(NASA-TM-82957; E-1372; NAS 1.15:82957) Avail: NTIS HC A02/MF A01 CSCL 10C

The factors that might influence the cycle life vs. depth of discharge relationship are examined. This is done first at the single cell level using a progressively more complex cell life model. This is then extended to multicell battery strings where the stochastic aspects associated with groupings of cells are introduced. These relationships are important when considering the weight, cost, and life of battery packs. The results of this theoretical study are compared with a recent review of actual cell cycling data. The factors examined are the rate of capacity loss, the amount of excess capacity built into the cells, and the penalty in capacity loss resulting from the use of deep depths of discharge. This study suggests that the relationship between cycle life and depth of discharge is not one that can be varied of significantly improved by cell research. The relationship appears to be determined by certain more or less fixed cell parameters. Among multicell strings, the standard deviation, as expected, plays an important role in determining overall battery life. Author

N83-10559*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
MULTIFUEL EVALUATION OF RICH/QUENCH/LEAN COMBUSTOR
J. J. Notardonato, A. S. Novick (Detroit Diesel Allison), and D. L. Troth (Detroit Diesel Allison) 1982 12 p refs Presented at the Joint Power Conf., Denver, 17-21 October 1982
(Contract DE-AI01-77ET-13111)
(NASA-TM-82986; E-1418; DOE/NASA/13111-10; NAS 1.15:82986) Avail: NTIS HC A02/MF A01 CSCL 21B

The fuel flexible combustor technology was developed for application to the Model 570-K industrial gas turbine engine. The technology, to achieve emission goals, emphasizes dry NOx reduction methods. Due to the high levels of fuel-bound nitrogen (FBN), control of NOx can be effected through a staged combustor with a rich initial combustion zone. A rich/quench/lean variable geometry combustor utilizes the technology presented to achieve low NOx from alternate fuels containing FBN. The results focus on emissions and durability for multifuel operation. S.L.

N83-10560*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
COMBUSTION CHARACTERISTICS OF HYDROGEN. CARBON MONOXIDE BASED GASEOUS FUELS
Joseph J. Notardonato, David J. White (Solar Turbines Inc.), Alan J. Kubasco (Solar Turbines Inc.), and Richard T. LeCren (Solar Turbines Inc.) 21 Oct. 1981 16 p refs Presented at the Joint Power Conf., Denver, 17-21 Oct. 1982
(Contract DE-AI01-77ET-13111)
(NASA-TM-82998; E-1434; NAS 1.15:82998; DOE/NASA/13111-13) Avail: NTIS HC A02/MF A01 CSCL 21D

An experimental rig program was conducted with the objective of evaluating the combustion performance of a family of fuel gases based on a mixture of hydrogen and carbon monoxide. These gases, in addition to being members of a family, were also representative of those secondary fuels that could be produced from coal by various gasification schemes. In particular, simulated Winkler, Lurgi, and Blue-water low and medium energy content gases were used as fuels in the experimental combustor rig. The combustor used was originally designed as a low NOx rich-lean system for burning liquid fuels with high bound nitrogen levels. When used with the above gaseous fuels this combustor was operated in a lean-lean mode with ultra long residence times. The Blue-water gas was also operated in a rich-lean mode. The results of these tests indicate the possibility of the existence of an 'optimum' gas turbine hydrogen - carbon monoxide based secondary fuel. Such a fuel would exhibit NOx and high efficiency over the entire engine operating range. It would also have sufficient stability range to allow normal light-off and engine acceleration. Solar Turbines Incorporated would like to emphasize that the results presented here have been obtained with experimental rig combustors. The technologies generated could, however, be utilized in future commercial gas turbines. B.W.

N83-10561*# Joint Center for Graduate Study, Richland, Wash.
CONCEPTUAL DESIGN AND COST ANALYSIS OF HYDRAULIC

OUTPUT UNIT FOR 15 kW FREE-PISTON STIRLING ENGINE Final Report
M. A. White Aug. 1982 139 p refs Prepared in cooperation with Flow Industries Inc., Kent, Wash.
(Contract DEN3-212)
(NASA-CR-165543; DOE/NASA/0212-1; NAS 1.26:165543) Avail: NTIS HC A07/MF A01 CSCL 10B

A long-life hydraulic converter with unique features was conceptually designed to interface with a specified 15 kW(e) free-piston Stirling engine in a solar thermal dish application. Hydraulic fluid at 34.5 MPa (5000 psi) is produced to drive a conventional hydraulic motor and rotary alternator. Efficiency of the low-maintenance converter design was calculated at 93.5% for a counterbalanced version and 97.0% without the counterbalance feature. If the converter were coupled to a Stirling engine with design parameters more typcial of high-technology Stirling engines, counterbalanced converter efficiency could be increased to 99.6%. Dynamic computer simulation studies were conducted to evaluate performance and system sensitivities. Production costs of the complete Stirling hydraulic/electric power system were evaluated at $6506 which compared with $8746 for an alternative Stirling engine/linear alternator system. Author

N83-10562*# Computer Sciences Corp., Hampton, Va.
NECAP 4.1: NASA'S ENERGY COST ANALYSIS PROGRAM THERMAL RESPONSE FACTOR ROUTINE Progress Report, 1981 - 1982
Mivheal R. Weise Aug. 1982 26 p
(Contract NAS1-16078)
(NASA-CR-165982; NAS 1.26:165982) Avail: NTIS HC A04/MF A01 CSCL 10A

A thermal response factor is described and calculation sequences and flowcharts for RESFAC2 are provided. RESFAC is used by NASA's (NECAP) to calculate hourly heat transfer coefficients (thermal response factors) for each unique delayed surface. NECAP uses these response factors to compute each spaces' hourly heat gain/loss. S.L.

N83-10563# Institut Royal Meteorologique de Belgique, Brussels.
WIND POWER POTENTIAL IN BELGIUM
L. vanderAuwera, F. deMeyer, and L. M. Malet 1982 24 p refs (Publ-Ser-B-115; ISSN-0770-4615) Avail: NTIS HC A02/MF A01

The Weibull three-parameter model is discussed for estimation of mean wind power densities. This probability density function is a generalization of a number of more conventional density functions. Using wind speed observations, it is shown that this model generally gives a more reliable fit to the empirical wind speed frequency data than the density functions with one or two parameters. Wind power density estimations turn out to be strongly dependent on the hypothesized probability density function. The variation with height of the three parameters of the discussed model is investigated; no simple height dependence can be proposed. The variability of the yearly mean wind power with time is examined for three stations in Belgium and it is found that deviations of + or - 20 percent of the overall mean value may occur. The geographical variation of the mea wind power density and two examples of a contour map for the generator capacity factor are presented. Author

N83-10564 Missouri Univ., Columbia.
THE FABRICATION AND EVALUTION OF A SILICON PHOTOVOLTAIC CELL WITH A DIRECTLY NITRIDED TUNNEL INSULATOR Ph.D. Thesis
William Frank Richardson 1981 84 p
Avail: Univ. Microfilms Order No. DA8205416

The fabrication of MIS solar cells with nitrided insulator films is described. A technique for low temperature growth of the insulator film by direct nitridation in active nitrogen generated by electric discharge is presented. This film is found to be very smooth and its thickness is nearly independent of the active nitrogen exposure time. Cell performance is a strong function of exposure time and a film densification growth mechanism is proposed. The nitrided cells were empirically optimized for energy conversion performance and characterized according to Schottky barrier diode theory. Physical constants governing cell operation are obtained from current voltage and capacitance voltage measurements. Active area conversion efficiencies are nominally 8 percent as compared to 8 1/2 percent nominal efficiency for similarly fabricated cells with thermally grown silicon oxide insulators. Quantum efficiencies under monochromatic illumination in the visible spectrum are shown to be higher than those of junction type cells. Dissert. Abstr.

N83-10565 Florida Univ., Gainesville.
METHODS FOR INVESTIGATING THE PROPERTIES OF POLYCRYSTALLINE SILICON P-N JUNCTION SOLAR CELLS Ph.D. Thesis
Jeffrey Alan Mazer 1981 153 p
Avail: Univ. Microfilms Order No. DA8203696

Experimental and analytical methods are developed for investigating the properties and performance degrading mechanism of polycrystalline silicon p-n junction solar cells. The degrading effects of areal inhomogeneity are demonstrated by means of a parallel subcell equivalent circuit model. It is shown that it is the area of the poor quality material in a silicon p-n junction solar cell that dominates in determining the overall cell performance. An experimental method is developed for assessing the validity of the shifting approximation for solar cells made from polysilicon and other material. The experimental data suggest that the shifting approximation is valid for a variety of polysilicon solar cells in which the intragrain base minority carrier diffusion length is small than or equal to the average grain diameter. The current components associated with the grain boundaries of diffused p-n junction polysilicon solar cells made on Wacker substrates are analyzed and experimentally identified. Dissert. Abstr.

N83-10566*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
NECAP 4.1: NASA'S ENERGY-COST ANALYSIS PROGRAM FAST INPUT MANUAL AND EXAMPLE
Ronald N. Jensen and David L. Miner (Computer Sciences Corp., Hampton, Va.) Aug. 1982 74 p refs
(NASA-TM-83241; NAS 1.15:83241) Avail: NTIS HC A04/MF A01 CSCL 10A

NASA's Energy-Cost Analysis Program (NECAP) is a powerful computerized method to determine and to minimize building energy consumption. The program calculates hourly heat gain or losses taking into account the building thermal resistance and mass, using hourly weather and a response factor method. Internal temperatures are allowed to vary in accordance with thermostat settings and equipment capacity. NECAP 4.1 has a simplified input procedure and numerous other technical improvements. A very short input method is provided. It is limited to a single zone building. The user must still describe the building's outside geometry and select the type of system to be used. Author

N83-10567*# New Mexico Univ., Albuquerque. Bureau of Engineering Research.
STUDY OF THE PHOTOVOLTAIC EFFECT IN THIN FILM BARIUM TITANATE Semiannual Report
W. W. Grannemann and Vineet S. Dharmadhikari Oct. 1982 23 p refs
(Grant NAG1-95)
(NASA-CR-169435; NAS 1.26:169435;
EECE-274(82)-NASA-931-1) Avail: NTIS HC A02/MF A01 CSCL 10A

The basic mechanism associated with the photovoltaic phenomena observed in the R.F. sputtered BaTiO3/silicon system is presented. Series of measurements of short circuit photocurrents and open circuit photovoltage were made. The composition depth profiles and the interface characteristics of the BaTiO3/silicon system were investigated for a better understanding of the electronic properties. A Scanning Auger Microprobe combined with ion in depth profiling were used. S.L.

N83-10568*# Mechanical Technology, Inc., Latham, N. Y.
A CONCEPTUAL STUDY OF THE POTENTIAL FOR AUTO-

MOTIVE-DERIVED AND FREE-PISTON STIRLING ENGINES IN 30- TO 400-KILOWATT STATIONARY POWER APPLICATIONS Final Report
A. Vatsky, H. S. Chen, and John Dineen May 1982 118 p refs (Contract NAS3-21291)
(NASA-CR-165274; NAS 1.26:165274; MTI-82TR38) Avail: NTIS HC A06/MF A01 CSCL 10B

The technical feasibility of applying automotive-derived kinematic and free-piston Stirling engine concepts for stationary applications was explored. Automotive-derived engines offer cost advantages by providing a mature and developd engine technology base with downrating and parts commonality options for specific applications. Two engine sizes (30 and 400 kW), two Stirling engine configurations (kinematic and free-piston), and two output systems (crankshaft and hydraulic pump) were studied. The study includes the influences of using either hydrogen or helium as the working gas. The first kinematic configuration selects an existing Stirling engine design from an automotive application and adapts it to stationary requirements. A 50,000-hour life requirement was established by downrating the engine to 40 kW and reducing auxiliary loads. Efficiency improvements were gained by selective material and geometric variations and peak brake efficiency of 36.8 percent using helium gas was achieved. The second design was a four-cylinder, 400 kW engine, utilizing a new output drive system known as the z-crank, which provides lower friction losses and variable stroke power control. Three different material and working gas combinations were considered. Brake efficiency levels varied from 40.5 percent to 45.6 percent. A 37.5 kW single-cycle, free-piston hydraulic output design was generated by scaling one cylinder of the original automotive engine and mating it to a counterbalanced reciprocal hydraulic pump. Metallic diaphragms were utilized to transmit power. Author

N83-10569# Raytheon Co., Bedford, Mass. Missile Systems Div.
POWER CONDITIONING SUBSYSTEM DESIGN Interim Report, 17 Sep. 1979 - 30 Nov. 1981
John J. Moriarty, Alvin M. Herling, John J. Kelleher, and Donald W. Shute Wright-Patterson AFB, Ohio AFWAL Jan. 1982 112 p
(Contract F33615-79-C-2079; AF Proj. 3145)
(AD-A117736; AFWAL-TR-82-2005; BR-13058) Avail: NTIS HC A06/MF A01 CSCL 10/2

This interim report describes the results of the first two phases of a three phase program to provide designs of lightweight, low volume power conditioning subsystems in the range of 500 kilowatts (kW) to 30 megawatts (MW) as part of the Air Force exploratory development program in high power airborne electrical power supply technology. These designs are based on presently available component technology such as solid state switching devices, newly developed thyratons and high energy density capacitors. Although these subsystems are to be operated in a burst mode, active cooling concepts have been utilized wherever they would result in an advantage in weight or volume. GRA

N83-10570# Iowa State Univ. of Science and Technology, Ames.
FOSSIL-ENERGY Annual Report, 1 Oct. 1980 - 30 Sep. 1981
Mar. 1982 146 p refs Prepared for Pittsburgh Mining Technology Center, Pa.
(Contract W-7405-eng-82)
(DE82-018269; IS-4794) Avail: NTIS HC A07/MF A01

Methods for analysis, physical properties, microstructure, and methods for preparation and cleaning of coals are discussed. For individual titles, see N83-10571 through N83-10577.

N83-10571# Iowa State Univ. of Science and Technology, Ames.
RAPID ANALYSIS OF MINERAL CONTENT OF COAL: DEVELOPMENT OF AN ON-LINE MONITORING INSTRUMENT FOR PYRITE AND ASH IN COAL
J. E. Renson and R. A. Jacobson *In its* Fossil-Energy Mar. 1982 p 1-12 (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

The feasibility of developing a computer-controlled monitor to measure the quantitative and qualitative pyrite and mineral content in coal using X-ray powder diffraction techniques was investigated. The 15 deg pyrite peak is used to measure the pyrite content, since there are no interfering peaks near it caused by the presence of common minerals. It is practical to measure down to 0.5% pyrite in a coal matrix, although with extreme care and long run times, measurement down to 0.2% is possible. The coal is ground to 60 mesh unless mineral matter is being measured, in which case -200 mesh samples are used. The same diffracted intensity is obtained from a low density sample regardless of whether it is 2.5 mm thick or 'infinitely' thick. The sensitivity of the method is reduced by the presence of highly absorbing material. To overcome this problem, an X-ray souce at molybdenum radiation wavelength is used, decreasing the linear absorption coefficient to 115 cm(-1). Refinements of data analysis techniques are summarized. J.D.

N83-10572# Iowa State Univ. of Science and Technology, Ames.
ASHING PROPERTIES OF COAL BLENDS
Donald L. Biggs *In its* Fossil-Energy Mar. 1982 p 13-36 refs (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

The fusion properties of sulfur materials present in coals were investigated. The treatment of the samples of eleven different coals is described. Thermal treatment of low temperature ashing (LTA) concentrates of eight of the coals was performed, and raw and wash ashing curves were examined to determine what quantitative correlations, if any, exist between ashing parameters and rank of coal. The actual form of the function which describes the ashing curve is derived. J.D.

N83-10573# Iowa State Univ. of Science and Technology, Ames.
COAL PREPARATION AND TESTING
D. Birlingmair and R. Fisher *In its* Fossil-Energy Mar. 1982 p 37-47 (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

Upgrading of the pilot plant large scale test facility for testing and evaluating coal preparation equipment, processes, and instrumentation, and for producing large quantities of coal of required specification prepared under controlled conditions is described. A fact sheet describing the coal preparation plant is presented. J.D.

N83-10574# Iowa State Univ. of Science and Technology, Ames.
PERFORMANCE CHARACTERISTICS OF HEAVY MEDIA CYCLONES USING FLY ASH-DERIVED HEAVY MEDIA
D. Birlingmair and M. J. Murtha *In its* Fossil-Energy Mar. 1982 p 49-62 (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

The potential for use of the magnetically separated iron-rich fraction of coal fly ash as heavy medium material for float-sink benefication of coal was investigated. Comparative coal beneficiation separations are made using commercial magnetite samples and magnetically separated fly ash samples. Laboratory experimentation is used to characterize the heavy media materials, determine particle durability, measure abrasion and corrosion of construction materials, compare media stabilities and viscosities, and determine flow circuit power requirements. Author

N83-10575# Iowa State Univ. of Science and Technology, Ames.
A SYSTEMATIC INVESTIGATION OF THE ORGANOSULFUR COMPONENTS IN COAL
Thomas G. Squires and Clifford G. Venier *In its* Fossil-Energy Mar. 1982 p 71-101 refs (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

Progress in the development of a highly efficient, low cost chemical method for removing organic sulfur from large quantities of coal is described. The evaluation of existing oxydesulfurization techniques; the modification of existing oxydesulfurization processes; the application of new and established chemical reactions to organosulfur materials; the development of new desulfurization

processes; and the determination of the organosulfur functional group distribution in coal are summarized. J.D.

N83-10576# Iowa State Univ. of Science and Technology, Ames.
MICROSTRUCTURE OF COAL
W. Straszheim and R. T. Greer *In its* Fossil-Energy Mar. 1982 p 103-132 refs (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

The use of automatic image analysis in conjunction with a scanning electron microscope in order to rapidly measure trace elements in situ was investigated. The association of trace elements with the various organic and mineral phases and the size distribution of the affected phases are discussed. Direct organic sulfur determinations with application to both raw and processed coals and to various macerals within those coals are described. In particular, the technique is being applied with a view to establishing limits of confidence on the results produced, including the estimated difference in sulfur levels between determinations on different samples. J.D.

N83-10577# Iowa State Univ. of Science and Technology, Ames.
PHYSICOCHEMICAL CLEANING AND RECOVERY OF COAL
T. D. Wheelock *In its* Fossil-Energy Mar. 1982 p 133-145 refs (For primary document see N83-10570 01-44)
Avail: NTIS HC A07/MF A01

The development and demonstration of a method of depressing iron pyrites which is applicable to both the froth flotation and oil agglomeration methods of cleaning and recoverying fine-size coal are described. Author

N83-10578# Argonne National Lab., Ill. Energy and Environmental Systems Div.
PROCEEDINGS OF THE US DEPARTMENT OF ENERGY/ ARGONNE NATIONAL LABORATORY CONTRACTORS' RESEARCH AND DEVELOPMENT WORKSHOP: CONVERTING WASTE TO ENERGY
Feb. 1982 373 p refs Workshop held in Savannah, 1-4 Dec. 1981 Sponsored by DOE
(DE82-014337; ANL/CNSV/TM-96; CONF-811245) Avail: NTIS HC A16/MF A01

Waste energy utilization research is reported. For individual titles, see N83-10579 through N83-10596.

N83-10579# National Bureau of Standards, Washington, D.C. Thermal Processes Div.
A LABORATORY APPROACH TO OBTAIN SUSPENSION COMBUSTION DATA FOR REUSE DERIVED FUELS
A. Macek and S. R. Charagundla *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne National Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 1-15 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

Laboratory scale measurement of burning rates of entrained RDF samples is discussed. The resulting data are expected to be relevant for estimating the characteristics of (1) pulverized fuel combustion and (2) the suspension fraction of spreader stoker combustion. A furnace is described allowing direct measurement of fuel particle burning times as functions of the parameters of the entraining gas flow. Preliminary results on combustion of a pulverized coal sample in that furnace are presented. An ancillary study of entrainment characteristics of these samples was made in a cold flow elutriation apparatus. Settling velocity data are presented (1) for particles of controlled sizes, shapes and densities representative of RDF and (2) for two screened fractions of an RDF sample. These results will be used in subsequent RDF combustion studies. Author

N83-10580# National Bureau of Standards, Washington, D.C. Chemical Thermodynamics Div.
AN OXYGEN FLOW CALORIMETER FOR DETERMINING THE HEATING VALUE OF KILOGRAM SIZE SAMPLES OF MUNICIPAL SOLID WASTE
E. S. Domalski, K. L. Churney, A. E. Ledford, R. V. Ryan, and M. L. Reilly *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 16-32 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

A calorimeter to determine the enthalpies of combustion of kilogram size samples of minimally processed municipal solid municipal waste (MSW) in flowing oxygen near atmospheric pressure is discussed. The organic fraction of 25 gram pellets of highly processed MSW was burned in pure oxygen to CO2 and H2O in a small prototype calorimeter. The carbon content of the ash and the uncertainty in the amount of CO in the combustion products contribute calorimetric errors of 0.1 percent or less to the enthalpy of combustion. Large pellets of relatively unprocessed MSW have been successfully burned in a prototype kilogram size combustor at a rate of 15 minutes per kilogram with CO/CO2 ratios not greater than 0.1 percent. The design of the kilogram size calorimeter was completed and construction was begun. Author

N83-10581# Midwest Research Inst., Kansas City, Mo.
AN ECONOMIC AND ENGINEERING ANALYSIS OF THE FULL-SCALE TROMMEL SCREEN OPERATIONS AT BALTIMORE COUNTY, MARYLAND
G. Joe Hennon *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 33-47 refs (For primary document see N83-10578 01-44)
(Contract DE-AC03-80CS-24330)
Avail: NTIS HC A16/MF A01

A trommel screen installed at the Baltimore County municipal solid waste processing facility operated by Teledyne National is evaluated. The objectives of the program are to ascertain the physical performance of the trommel and the economics of operation. The purpose of the trommel and the economics of operation. The purpose of the trommel is to improve air classified refuse derived fuel by removing fine material that is primarily composed of noncombustible small pieces of glass, metal, stones, dirt, and sand. A series of tests have been performed as a function of trommel feed rate and rotational speed in each of the four seasons to determine screening efficiency, energy requirements, costs, cost benefit ratio, and comparison to theory and models. Recommendations will be made for design and operational parameters. Author

N83-10582# National Bureau of Standards, Washington, D.C. Chemical Kinetics Div.
CHARACTERIZATION OF RDF PROPERTIES THROUGH HIGH PRESSURE DIFFERENTIAL SCANNING CALORIMETRY
W. Tsang and J. A. Walker *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 48-64 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

High Pressure Differential Scanning Calorimetry was employed to study the thermal analytical properties of refuse derived fuels (RDF). By comparison with studies on newsprint and polyethylene, four characteristic thermogram peaks are identified with the smoldering combustion of plastics, cellulosic materials and two types of char respectively. Similarities and differences between thermograms of refuse derived fuels and coal samples are noted. The variability of thermal analytical properties as a function of process parameters, sampling, and source was determined. Finally, data from pyrolytic studies using thermogravimetry as well as scanning calorimetry are presented. Author

N83-10583# Northern Energy Corp., Boston, Mass.
SMALL-SCALE WASTE-TO-ENERGY SYSTEMS: A STATE-OF-THE-ART REPORT
Allen L. White *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 65-71 refs (For primary document see N83-10578 01-44)

Avail: NTIS HC A16/MF A01

For industry and local government, small scale waste to energy systems represent an increasingly attractive option to enhance energy security, control energy costs, generate revenues and alleviate landfill constraints. Projects are characterized by: a mix of modular and waterwall systems; small and medium size industrial steam customers; a nascent interest in cogeneration; the utilization of a variety of public financing instruments; and growing vendor involvement in facility operations. Experience also points to the pivotal role of one or a few persistent individuals during the project implementation process. Recent operating history is likely to provide the foundation for steady growth in the number of small scale systems during the next decade. Author

N83-10584# Waste Management, Inc., Pompano Beach, Fla.
SOLID WASTE TO METHANE GAS (REFCOM)
H. Peter Mooij *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 72-91 (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

RefCOM (refuse conversion to methane), a plant designed to test the commercial feasibility of producing methane gas from organic solid wastes is discussed. Author

N83-10585# Oak Ridge National Lab., Tenn. Chemical Technology Div.
ANFLOW: CHARACTERIZATION AND DEVELOPMENT OF AN ENERGY CONSERVING WASTEWATER TREATMENT SYSTEM
R. K. Genung, C. W. Hancher, and A. L. Rivera *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 92-109 refs (For primary document see N83-10578 01-44)
(Contract W-7405-eng-26)
Avail: NTIS HC A16/MF A01

An energy conserving wastewater treatment system based on an anaerobic upflow (ANFLOW) bioreactor containing fixed films of microorganisms was developed. The development of a wastewater treatment system which has significant energy conservation and/or energy production advantages as well as lower capital costs when compared to conventional wastewater treatment systems is discussed. E.A.K.

N83-10586# WED Enterprises, Glendale, Calif.
WATER HYACINTH WASTEWATER TREATMENT SYSTEM
c45
B. R. Schwegler, Jr. and C. A. Lee *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 110-125 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

A prototype water hyacinth wastewater treatment system which is in operation is discussed. The water hyacinth system requires less than 50% of the energy needed to run a comparably sized conventional secondary treatment system. When coupled with primary treatment, the water hyacinth system demonstrates removal of 80-90% total suspended solids and B.O.D., meeting secondary treatment standards. In the first year of operation, water hyacinth production yielded 47.8 dry metric tons/hectare year. The effects of varying harvest routines and detention times are investigated to optimize wastewater treatment and biomass production. Nutrient removal and biomass conversion to methane gas are investigated. E.A.K.

N83-10587# PIDC-Energy Development Corp., Philadelphia, Pa.
THE FEASIBILITY OF REFUSE-FIRED ENERGY GENERATION IN PHILADELPHIA, PENNSYLVANIA
W. M. Christman, III *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 131-139 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

The City of Philadelphia presently disposes of 816, 480 megagrams per year (MGY) of residential refuse, with 1 megagram = 10 to the 3rd power hilograms. Alternatives to a base case of continued incineration and landfilling are evaluated. It is assured that the feasibility studies will yield compatible products and will run a uniform economic analysis against the base case, using as inputs the outputs of the feasibility analyses. E.A.K.

N83-10588# Middlesex County Dept. of Solid Waste Management, New Brunswick, N.J.
INSTITUTIONAL FACTORS IN RESOURCE RECOVERY CO-DISPOSAL DEMONSTRATION PROJECT, MIDDLESEX COUNTY, NEW JERSEY, SPRING 1980 - SUMMER 1981
Robert M. McCarthy *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 140-156 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

A proposal to provide 1200 tons per day of solid waste disposal combined with 200 tons per day of sludge disposal was presented. The prospects for codisposal in Middlesex County were analyzed. Technically, codisposal was possible, however, it lacked a proven track record. Proposal for a resource recovery plant to be designed, built, and operated was acknowledged as consistent with County planning. E.A.K.

N83-10589# Gilbert/Commonwealth, Reading, Pa.
ENERGY RECOVERY AND COGENERATION FROM AN EXISTING MUNICIPAL INCINERATOR
Donald F. Crego, Virgil L. Eller (Central Wayne County Sanitation Authority), and Junius W. Stephenson (Havens and Emerson, Inc.) *In* Argonne National. Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 163-180 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

An existing 727 TPD incinerator burning mixed municipal refuse was deemed to be a feasible candidate for a cogeneration energy retrofit. It is indicated that equipment and construction of the retrofit will cost $17.6 million or $24,200/rated tonne in 1980 dollars; air pollution control equipment will cost 10.4 million or $14,300/tonne. Furnace temperature and gas samplings along with pilot air pollution control equipment tests were conducted. Refuse was characterized on both wet and dry seasons. Final design is based upon burning 155,000 TPY of refuse from which can be generated, sufficient steam and electricity for inhouse use and an additional amount of 64 million kWh for sale. E.A.K.

N83-10590# PSE and G Research Corp., Newark, N.J.
SEWAGE SLUDGE AS A SUPPLEMENTARY UTILITY BOILER FUEL
M. L. Zwillenberg, C. R. Guerra, and J. H. Singletary *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 181-195 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

The feasibility of utilizing sewage sludge as a supplementary boiler fuel was studied. Samples of sludge from sewage are gathered for chemicals analysis to determine the range of variation of composition and to select typical sludge compositions. Combustion tests are performed, and the effects of sludge combustion on utility boiler performance, corrosion, emission and economics is estimated. Design criteria for boilers convertible to sludge burning will be developed and a survey of the U.S. utility boiler population enables the estimation of the potential market for sludge as a fuel. E.A.K.

N83-10591# North Texas State Univ., Denton. Dept. of Chemistry.
URBAN WASTE AS A POTENTIAL SOURCE FOR BRICK PLANTS
K. E. Daugherty, A. Eberendu, J. Griffin, H. Gegbe, C. Ike, and A. Aboo *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 196-210 refs (For primary document see N83-10578 01-44)

Avail: NTIS HC A16/MF A01

A joint government/industry/university project was formulated to address the technical feasibility of utilizing municipal solid waste (MSW) as a commercial fuel for the brick industry. Specifically, refuse derived fuel (RDF) from MSW was investigated for three potential applications in the brick industry: (1) rotary brick kilns; (2) tunnel brick kilns; and (3) moisture dryers. The successful development of such a procedure would be a dramatic achievement with widespread applicability, transferability, and commercial merit for energy displacement. The sampling, collection, and analysis of MSW, the analysis of RDF, and the potential utilization of RDF as an alternate source of fuel for the brick industry are described. M.G.

N83-10592# Combustion Power Co., Inc., Menlo Park, Calif.
DEVELOPMENT OF A SOLID WASTE FIRED FLUIDIZED BOILER, PHASE 1
L. C. Preuit *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 211-225 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

Tests were conducted to develop solid waste fired fluid bed boiler (FBB) technology. The fluid bed facility incorporates water tubes for heat extraction and can burn over seven tons of refuse derived fuel per day. Municipal solid waste from surrounding communities is shredded and air classified to remove inerts and recoverable materials. Current and past work shows that a fluid bed boiler will be able to operate at excess air levels well below those presently required by conventional grate-type waste fired boilers, and with comparable or superior combustion efficiencies. Tests were conducted to investigate: the range of process conditions over which satisfactory operation can be maintained; suppression of acid gas emissions; recycle of elutriated fines back to the fluid bed; and fuel technology. In previous testing, operation was stable while firing refuse derived fuel for the duration of a 300-hour test. No agglomeration of bed material or slag formation was experienced. Low excess air, low exhaust gas emissions, and constant bed temperature demonstrated feasibility of steam generation from fluid bed combustion. M.G.

N83-10593# Systech Corp., Xenia, Ohio.
CONVERSION OF MUNICIPAL SOLID WASTE TO ENERGY, JACKSONVILLE, FLORIDA
Richard Frounfelker and Helen Belencan *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 226-245 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

A 227 megagram per day prototype auger combustor system is described and performance tests are discussed. The system is a two chamber, starved-air incenerator so named because of the auger located within the primary chamber which tumbles and moves the waste through the system. The feasibility evaluation of resource recovery in the city of Jacksonville, Florida, involved the determination of the following: (1) the amount and characteristics of the solid waste; (2) the location and requirement of candidate energy customers and materials markets; (3) the applicable incineration/heat recovery and resource recovery technologies; and (4) the institutional, legal, and environmental requirements for constructing a facility. The marketing plan developd to define the specific steps required to employ a waste-to-energy technology in the Jacksonville area is also discussed. M.G.

N83-10594# SCS Engineers, Covington, Ky.
DEMONSTRATION OF LANDFILL GAS ENHANCEMENT TECHNIQUES IN LANDFILL SIMULATORS
J. J. Walsh and W. G. Vogt *In* Argonne National Lab. Proc. Of US Dept. of Energy/Argonne Natl. Lab. Workshop Feb. 1982 p 266-284 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

Various techniques to enhance gas production in sanitary landfills were applied to landfill simulators. These techniques include (1) accelerated moisture addition, (2) leachate recycling, (3) buffer addition, (4) nutrient addition, and (5) combinations of the above. Results are compiled through on-going operation and monitoring of sixteen landfill simulators. These test cells contain about 380 kg of municipal solid waste. Quantities of buffer and nutrient materials were placed in selected cells at the time of loading. Water is added to all test cells on a monthly basis; leachate is withdrawn from all cells (and recycled on selected cells) also on a monthly basis. Daily monitoring of gas volumes and refuse temperatures is performed. Gas and leachate samples are collected and analyzed on a monthly basis. Leachate and gas quality and quantity resits are presented for the first 18 months of operation. M.G.

N83-10595# Engineering-Science, Inc., Arcadia, Calif.
RESEARCH, DEVELOPMENT AND DEMONSTRATION IN THE DESIGN OF SANITARY LANDFILL TO OPTIMIZE THE GENERATION AND CAPTURE OF COMPRESSIBLE GAS
M. E. Nosanov, F. E. Teeple, and S. C. Buesch (City of Los Angeles Dept. of Public Works) *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab Contractors' Res. and Develop. Workshop Feb. 1982 p 336-354 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

The influences of selected factors on the generation and recovery of methane gas from sanitary landfills were investigated. The factors included encapsulation, shredding, air classifying, moisture, and pH. Facilities consisting of six model sanitary landfill cells, each with a capacity of approximately 450 cubic yards of municipal waste, and auxiliary subsystems were constructed. Municipal waste in each cell is contained in a 30-mil thick polyvinly chloride plastic sheeting forming a virtually gas-tight envelope. Two cells were filled with as-collected urban waste, two with shredded waste, and two with shredded and air classified waste, constituting three pairs of cells. One of each pair is a control cell with the other used as an experimental variable. Systems were provided for adding measured amounts of water, removing and recirculating leachate, and for extracting gas and measuring gas flow. During testing, gas production and internal cell characteristics were measured to determine the effects of mechanical processing, moisture content, and leachate pH. M.G.

N83-10596# New York State Energy Research and Development Authority, Albany.
LANDFILL GAS RECOVERY: AN ANALYSIS OF RESULTS
Jeffrey M. Peterson *In* Argonne National Lab. Proc. of US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 355-364 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

Aspects of landfill gas recovery including the range of gas recovery, production rates, corrosion, medium-Btu industrial applications, and conversion to electricity via an internal combustion engine were investigated. It is estimated that the landfill site studied is capable of producing more than 2.17 x 10 to the 13th power Btu's of gas per year for a period of over eight years. M.G.

N83-10597# General Electric Co., Philadelphia, Pa. Advanced Energy Programs Dept.
DESIGN AND DEVELOPMENT OF A HIGH-CONCENTRATION PHOTOVOLTAIC CONCENTRATOR
R. C. Hodge Apr. 1982 112 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015673; SAND-81-7007) Avail: NTIS HC A06/MF A01

The design and development of a high concentration photovoltaic concentrator module is discussed. The design concept incorporating a curved groove domed Fresnel lens, a high concentration etched multiple vertical junctin solar cell and a passively cooled direct-bonded copper cell mount all packaged in a plastic module is discussed. Two seven inch diameter 1200x domed Fresnel lenses were fabricated using single point diamond turning technology. Testing confirmed optical transmission ef-

ficiencies of over 83%. Samples of the latest available cells were mounted and installed, with a domed Fresnel lens, into a prototype module. Subsequent testing demonstrated net lens-cell efficiencies of 10 to 13%. Salient conclusions were formulated as to this technology. DOE

N83-10598# Sandia Labs., Albuquerque, N. Mex. Experimental Facilities Operations Div.
RESULTS OF TESTING A DEVELOPMENT MODULE OF THE SECOND-GENERATION E-SYSTEMS CONCENTRATING PHOTOVOLTAIC-THERMAL MODULE
Thomas D. Harrison Apr. 1982 25 p
(Contract DE-AC04-76DP-00789)
(DE82-015671; SAND-82-0701) Avail: NTIS HC A02/MF A01

An actively-cooled linear Fresnel lens concentrating photovoltaic and thermal module, designed and built by E-Systems, was tested in the Photovoltaic Advanced Systems Test Facility. Physical, electrical, and thermal characteristics of the module are presented. Module performance is characterized through the use of multiple linear regression techniques. DOE

N83-10599# Sandia Labs., Livermore, Calif. Solar Programs Div.
DESIGNING THE MANIFOLD PIPING FOR PARABOLIC-TROUGH-COLLECTOR FIELDS
John K. Sharp Apr. 1982 28 p refs
(Contract DE-AC04-76DP-00789)
(DE82-015998; SAND-81-1780) Avail: NTIS HC A03/MF A01

A simple procedure for sizing the manifold piping in parabolic-trough collector fields is presented. The proper manifold pipe sizes and insulation thicknesses are obtained without detailed optimizations of the thermal and electrical parasitics. An engineering constraint determines the pipe sizes and an insulation table lists the proper insulation thicknessess. The engineering constraint limits the pressure drop in the manifold piping to a fraction of the pressure drop in the (RADICAL)T string. This ensures output temperature control in all (RADICAL)T strings. A four-step procedure is presented to size the manifold piping; tables showing the proper insulation thickness as a function of pipe size and temperature are given. DOE

N83-10600# Oregon Inst. of Tech., Klamath Falls. Geo-Heat Center.
COMMUNITY HEAT-PUMP SYSTEM, KLAMATH COUNTY, OREGON
Mar. 1982 19 p
(Contract DE-FG06-79ET-17156)
(DE82-015106; DOE/ET-17156/T21) Avail: NTIS HC A02/MF A01

The possibility of heating 47 proposed homes on a new development site using ground water source heat pumps is discussed. The pumping temperatures are 780 F for No. 2 Well, neither temperature is hot enough for direct space heating. Temperature profiles of the wells indicate that a temperature hot enough for direct heating (about 1100 F or above) cannot be found at reasonable depth. Since direct geothermal heating is not a practical alternative, the tract will be all-electric since this is the only energy source in the area. The economic feasibility of a community heat pump system that would reduce the amount of electrical energy required to service the homes is addressed. DOE

N83-10601# Grumman Aerospace Corp., Bethpage, N.Y.
INVESTIGATIONS OF THE TORNADO WIND ENERGY SYSTEM
James T. Yen Golden, Colo. Midwest Research Inst. Jun. 1982 146 p refs Prepared for Midwest Research Inst., Golden, Colo.
(Contracts EG-77-C-01-4042; DE-AC02-77CH-00178; E(49-18)-2555)
(DE82-017122; SERI/TR-11052-1) Avail: NTIS HC A07/MF A01

Current test results are presented on the Tornado Wind Energy System (TWES). The performance and potential of TWES systems using wind tunnel models are discussed. Experimental results on system performance with a simple bladed turbine in both the Grumman Research Tunnel and Langley V/STOL Tunnel are presented, followed by descriptions of a larger, 15-ft model and data from tests of a 30-in turbine, as well as results from a cost analysis. It is concluded that TWES has a good commercial potential. DOE

N83-10602# Secord (Nelson W.), Brighton, Mich.
WECS-LOAD CONTROLLED PITCH-VARIABLE LOAD CONVERSION TO HEAT
Nelson W. Secord 29 Mar. 1982 6 p
(Grant DE-FG02-81R-510309)
(DE82-014683; DOE/R5-10309/1) Avail: NTIS HC A02/MF A01

Installing a 4 kW windmill and instrumentation on a 100-ft. free-standing lattice tower, developing load control circuitry that will store excess energy in a 1000-gallon electrically heated water tank which will also provides domestic heat via a heat exchanger, and developing a torque controlled pitching hub and blade system are described. Project status and costs are discussed. DOE

N83-10603# Sandia Labs., Albuquerque, N. Mex. Applied Mechanics Div.
AEROELASTIC STABILITY ANALYSIS OF A DARRIEUS WIND TURBINE
David Popelka Feb. 1982 37 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017001; SAND-82-0672) Avail: NTIS HC A03/MF A01

An aeroelastic stability analysis was developed for predicting flutter instabilities on vertical axis wind turbines. The analytical model and mathematical formulation of the problem are described as well as the physical mechanism that creates flutter in Darrieus turbines. Theoretical results are compared with measured experimental data from flutter tests of the Sandia 2 Meter turbine. Based on this comparison, the analysis appears to be an adequate design evaluation tool. DOE

N83-10604# Tetra Tech, Inc., Pasadena, Calif.
TECHNICAL AND ECONOMICAL ASSESSMENT ON TETHERED WIND-ENERGY SYSTEMS (TWES)
Okitsugu Furuya and S. Maekawa Jun. 1982 88 p refs
(Contracts DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-017120; SERI/TR-09172-2) Avail: NTIS HC A05/MF A01

The potential of thethered wind energy systems for energy conversion in the upper atmosphere was investigated. The vertical takeoff and landing lift generation concept had the highest potential as compared to balloon, wind and hybrid concepts. DOE

N83-10605# Total Environmental Action, Inc., Harrisville, N.H.
STUDY OF PHOTOVOLTAIC RESIDENTIAL RETROFITS. VOLUME 1: EXECUTIVE SUMMARY
Douglas E. Mahone, Peter I. Temple, Jennifer A. Adams, Barbara B. Chalmers, Andrew E. Motter, and Alan E. Millner Apr. 1982 84 p 3 Vol.
(Contract DE-AC04-76DP-00789)
(DE82-015793; SAND-81-7019/1) Avail: NTIS HC A05/MF A01

The problems and potentials are analyzed for widespread residential retrofits of PV power systems. Included are data on the existing housing stock, designs for array mounting and system electrical wiring, and economic analyses for retrofits. DOE

N83-10606# Foster-Miller Associates, Inc., Waltham, Mass.
EVALUATION OF THE KLOSWALL LONGWALL MINING SYSTEM Final Report
Paul J. Guay Apr. 1982 131 p refs
(Contract DE-AC01-76ET-12489)
(DE82-015881; DOE/ET-12489/T1) Avail: NTIS HC A07/MF A01

A new longwall mining system specifically designed to extract a very deep web (48 inches or deeper) from a longwall panel was studied. Productivity and cost analysis comparing the new mining system with a conventional longwall operation taking a 30 inch wide web is presented. It is shown that the new system will increase annual production and return on investment in most cases. Conceptual drawings and specifications for a high capacity three drum shearer and a unique shield type of roof support

specifically designed for very wide web operation are reported. The advantages and problems associated with wide web mining in general and as they relate specifically to the equipment selected for the new mining system are discussed. DOE

N83-10607# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE REPORT. VOLUME 7: BEVERLY HIGH SCHOOL, BEVERLY, MASS.
Apr. 1982 30 p
(Contract DE-AC04-76DP-00789)
(DE82-015790; SAND-81-7088/7) Avail: NTIS HC A03/MF A01

Performance data are given for a grid-connected photovoltaic power supply at a Massachusetts high school for the month of March, 1982. Data presented include: daily and monthly electrical energy produced: daily and monthly array effiency; energy produced as a function of power level, voltage, cell temperature, and hour of the day; power conditioner input, output, and efficiency for two powr conditioner units and for the overall power conditioning system; daily and monthly photovoltaic energy to load and the corresponding dollar value; grid to load energy from February 17 through April 5; photovoltaic system efficiency; capacity factor; daily system availability; daily and hourly insolation; heating and cooling degree days; hourly and monthly ambient temperature; hourly and monthly wind speed; wind direction distribution; number of freeze/thaw cycles; hourly cell temperature; and data acquisition mode and recording interval plot. Also included are seven summaries of site events. DOE

N83-10608# Boeing Computer Services, Inc., Seattle, Wash.
INTERMEDIATE PHOTOVOLTAIC SYSTEM APPLICATION EXPERIMENT OPERATIONAL PERFORMANCE. VOLUME 6 FOR LOVINGTON SQUARE SHOPPING CENTER, LOVINGTON, NM
Jan. 1982 8 p
(Contract DE-AC04-76DP-00789)
(DE82-015476; SAND-81-7099/6) Avail: NTIS HC A02/MF A01

Performance data are presented for a 100 kW-peak grid connected flat panel photovoltaic power supply at a New Mexico shopping center for the month of December 1981. Data include daily and monthly electrical energy produced, daily and monthly incident solar energy in the array plane, efficiency of the array and of the power conditioner, capacity factor, insolation, and the data acquisition mode and recording interval plot. Also included is a site event report involving the operating data acquisition system. DOE

N83-10609# Pacific Northwest Lab., Richland, Wash.
EFFECT OF EXPOSING TWO COMMERCIAL MANUFACTURERS SECOND-SURFACE SILVER/GLASS MIRRORS TO ELEVATED-TEMPERATURE, MECHANICAL LOADING, AND HIGH-HUMIDITY ENVIRONMENTS
L. S. Dake and M. A. Lind Apr. 1982 20 p refs
(Contract DE-AC06-76RL-01830)
(DE82-013274; PNL-4282) Avail: NTIS HC A02/MF A01

A preliminary examination of the effect of three accelerated exposure parameters on second surface silver/glass mirrors was performed. The variables studied were temperature (elevated and sub-zero), humidity and mechanical loading. One test consisted of exposing mirror coupons to dry heat (800 C) and heat plus water vapor (800 C, approx. 100% RH) environments. Another test consisted of subjecting mechanically loaded mirror strips to sub-zero temperature (-100 C), dry heat (800 C), and heat plus water vapor. Samples were evaluated quantitative determination of the effects of exposure testing on the mirror was done with spectrophotometer spectral hemispherical and diffuse reflectance measurements. Degradation that was progressive with time was observed for mirrors exposed to dry heat and heat plus water vapor. The degradation did not have the same visual appearance for the two environments. Mechanical loading at -200 C produced no degradation after three months' exposure time. Mechanical loading in dry heat and heat plus water vapor environments resulted in mirror degradation that was the same as that found in unloaded mirrors exposed to the same temperature and humidity. DOE

N83-10610# Sandia Labs., Albuquerque, N. Mex. Thermophysical Properties Div.
SOLAR HEMISPHERICAL REFLECTOMETER MODIFICATION FOR SECOND-SURFACE MIRROR MEASUREMENT
A. R. Mahoney May 1982 28 p refs
(Contract DE-AC04-76DP-00789)
(DE82-016913; SAND-82-0934) Avail: NTIS HC A03/MF A01

A commercial reflectometer has been modified for improved measurement of the solar hemispherical reflectance of second surface mirrors. The Solar Spectrum Reflectometer (SSR), manufactured by Devices and Services Co., Dallas, TX is designed to measure the solar hemispherical reflectance of flat, diffusely reflecting and first surface specular samples. Initial investigation of the device revealed that the SSR yielded significant deviations from the actual solar reflectance of second surface mirrors. The low reflectance values were determined to be caused by the displacement of the reflective surface away from the measurement port caused by the mirror protective layer. Instrument modifications are described which reduce the sensitivity of the instrument to second surface mirror thickness. The modifications involve enlarging both the sample port opening and the specular disk (target) located inside the measurement cavity, adjusting the lamp assembly height, and installing a diffuser over the lamp. The modified SSR demonstrated only a small linear reflectance variation with mirror displacement. It was shown that any mirror of known solar hemispherical reflectance having a thickness within the range, 0 mm (first surface) to 3.2 mm, could be used as the reflectance standard. DOE

N83-10611# Davis Energy Group, Calif.
FEASIBILITY STUDY OF GEOTHERMAL HEATING, MODOC LASSEN HOUSING PROJECT
Nov. 1981 26 p
(Contract DE-FG06-79ET-27256)
(DE82-015099; DOE/ET-27256/T10) Avail: NTIS HC A03/MF A01

The feasibility of using geothermal water for space and domestic water heating systems is evaluated. For the six units considered, the space heating load is four times the domestic water heating load. Since the geothermal water temperature is uncertain, two scenarios were evaluated. In the first, which assumes 1600F supply temperature, the geothermal system is assumed to satisfy the entire space and domestic water heating loads. In the second, which assumes the supply temperature to be less than 1200F at the wellhead only space heating is provided. The economics of the first scenario are quite favorable. The investment is even more favorable for the second scenario, due to the higher cost and lower resultant savings for the domestic water components. Forced air space heating from geothermal is recommended. Domestic water heating is recommended pending additional information on supply water temperature. DOE

N83-10612# Enviro Control, Inc., Rockville, Md.
PROCEEDINGS OF THE CONFERENCE ON ENERGY CONSERVATION: RETROFIT OF MUNICIPAL WASTEWATER TREATMENT FACILITIES
Feb. 1982 270 p refs Conf. held in Los Angeles, 23-25 Jun. 1981
(Contract W-31-109-38-5830)
(DE82-013710; ANL/CNSV/TM-95) Avail: NTIS HC A12/MF A01

The concepts of the roles of heat and temperature, ventilation and water removal when organic material is assembled into a self insulating mass are summarized. The practical application of these concepts in static pile configuration or the Rutgers process are outlined. The concepts and means of application are relevant to all design approaches whether or not a reactor structure is involved, whether the process is batch or continuous, and whether the mass is agitated or static. DOE

N83-10613# Tennessee Valley Authority, Muscle Shoals, Ala. Office of Agricultural and Chemical Development.
BIOMASS FUELS UPDATE. TVAS BIOMASS FUELS PROGRAM

Feb. 1982 28 p
(DE82-904990; TVA/OACD-82/9) Avail: NTIS HC A03/MF A01

Equipment was installed and tests were conducted on the ethanol from hardwood project. Location of hardwoods, to improve forest management, and to reduce the cost of harvesting woody biomass was assessed. Substantial underutilized cropland exists in the Valley, and a questionnaire survey was administered to supplement available cropland data. The potential liquid fuel yields and production management practices for alternative starch, sugar, and vegetable oil crops were determined to obtain benchmark data and to evaluate alcohol production from alternative agricultural feedstocks. Workshops were conducted to provide information on production of alcohol. DOE

N83-10614# Friedrichsfeld G.m.b.H., Mannheim (West Germany). Steinzeug Und Kunststoffwerke.
PRODUCTION TECHNOLOGY OF AN ELECTROLYTE FOR Na/S BATTERIES Final Progress Report, Jun. 1980
Guenther Heimke, Helmut Mayer, and Arno Reckziegel Bonn Bundesministerium fuer Forschung und Technologie May 1982 82 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-065; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsrune, West Germany DM 17

The trend to develop a cheap electrochemical electric battery and the development of the Na/S system are discussed. The main element in this type of battery is the beta Al2O3 solid electrolyte. Characteristics for this material of first importance are: specific surface, density of green and of sintered material, absence of cracks, gas permeability, resistance to flexion, purity, electrical conductivity, crystal structure and dimensions. Influence of production method on all these characteristics were investigated, e.g., method of compacting powder, tunnel kiln sintering versus static chamber furnace sintering, sintering inside a container or not, and type of kiln material when sintering in a container. In the stationary chamber furnace, beta alumina ceramics were produced with a density of 3.2 g/cm3, a mechanical strength higher than 160 MPa, and an electrical conductivity of about 0.125 Ohm-1cm-1 at 300 C. The best kiln material proved to be MgO and MgAl2O3. MgO ceramics. Author (ESA)

N83-10615# Technische Hochschule, Aachen (West Germany). Inst. fuer Eisenhuettenkunde.
PRESSURE-SWINGING UNDERGROUND GASIFICATION. THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF GASIFICATION, PHASE 2 Final Report, Oct. 1981
Mehrdad Mohtadi, Peter Breidung, Florian Fuhrmann, Klaus Guntermann, Manfred Kurth, Michael Paersch, Guido Ropertz, and Guenter Subklew Bonn Bundesministerium fuer Forschung und Technologie May 1982 114 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-066; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 24

Simulation experiments were run in order to determine the form of the combustion front, the combustion front velocity, the different type of gases liberated, the effect on quality of steam/oxygen ratio, the efficiency of gasification process, and data for regulating and conducting from the surface the channel gasification process. The simulation of the channel gasification process was performed in coal samples 0.32 m in diameter, 4 m long with an axial channel of 3 cm in diameter. Samples were put in an autoclave working at 1 bar or 10 bar pressure. The simulation of the penetration process was performed with coal samples 1 m long and 170 mm in diameter put in an autoclave able to work at 100 bar pressure. It is stated that the penetration process not usable is without a preliminary increase of coal permeability. Reverse combustion was also tested at pressures of 1 and 10 bar. Theoretical investigations simulated a nonstationary gasification. It is shown that this method is usable in case of oxidizing gasification. Practical confirmation of the computation has to be carried out. The reaction constants by air/steam gasification are calculated. A stationary model studied the effect of gas temperature, of steam/coal ratio, and pressure. Author (ESA)

N83-10616# Bergbau-Forschung G.m.b.H., Essen (West Germany). Abteilung Physikalische Chemie.
STEAM GASIFICATION OF COAL, PROJECT PROTOTYPE PLANT NUCLEAR PROCESS HEAT: REPORT AT THE END OF THE REFERENCE PHASE Final Report, Dec. 1980
Karl Heinrich vanHeek Bonn Bundesministerium fuer Forschung und Technologie May 1982 271 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-069; ISSN-0340-7608) Avail: NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 43,50

The work carried out in the field of steam gasification of coal is described. On the basis of the status achieved to date, it can be stated that the mode of operation of the gas generator developed, including the direct feeding of caking high volatile coal, is technically feasible. Moreover, throughput can be improved by 65% at minimum by using catalysts. On the whole, industrial application of steam gasification, using nuclear process heat, stays attractive compared with other gasification processes. Not only coal is conserved, but also the costs of the gas manufactured are favorable. As confirmed by recent economic calculations, these are 20 to 25% lower. Author (ESA)

N83-10617# Ruhrkohle A.G., Essen (West Germany).
PNEUMATIC STOWING WITH LATERAL DISCHARGE IN COAL FACES WITH THICK SEAMS Final Report, July 1981
Hans-Dietrich Sielaff Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 46 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with Bergbau A.G. Lippe and Bergwerk Nordstern
(BMFT-FB-T-82-074; ISSN-0340-7608; RAG-K-330) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9

A method of introducing early bearing and compact pneumatic stowing in thick coal beds was developed. In an early phase, the pneumatic stowing method with lateral discharge was tested in conjunction with special chock supports. Due to difficult geological conditions in the coal bed and to insufficient stability of the special chock support the trial failed after 7 months. The whole system was modified for pneumatic stowing with front discharge and shuttering. This method turned out to be unsuccessful as well. A shield support designed for pneumatic stowing with front discharge was used in another panel of the same coal bed. This method proved successful. Author (ESA)

N83-10618# Forschungsstelle fuer Energiewirtschaft, Munich (West Germany).
STUDY OF THE POSSIBILITIES OF MORE RATIONAL USE OF ENERGY IN THE SECTOR OF TRADE AND COMMERCE, PART 1 Final Report, Aug. 1981
Karl Friedrich Ebersbach, Alfred Fischer, Guenther Layer, Walter Steinberger, Manfred Wegner, and Bernhard Wiesner Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 146 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-076-Pt-1; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 30,50

The energy demand in trade and commerce was analyzed. Measures to improve the energy demand structure are presented. In several typical firms, like hotels, office buildings, locksmith's shops, motor vehicle repair shops, butcher's shops, laundries and bakeries, energy consumption was surveyed and statistically evaluated. Subjects analyzed are: the development of the energy supply; the technology of energy application; the final energy demand broken down into demand for light, power, space heating and process heat as well as the demand for cooling; the daily

and annual load curve of energy consumption and its dependence on various parameters; and measures to improve the structure of energy demand. The detailed measurement points out negligences in the surveyed firms and shows some possibilities for likely energy savings. In addition, standard values for specific energy consumption are obtained. Author (ESA)

N83-10619# Gesamthochschule, Kassel (West Germany). Arbeitsgruppe Technische Physik.

ELECTRON CONDUCTIVITY OF THE ACTIVE MASSES OF LEAD ACID BATTERIES DURING DISCHARGE AND PERMANENT SERVICE Final Report, Oct. 1980

Heinrich Metzendorf Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 102 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-078; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,50

Electrical and structural properties of positive and negative grid plate electrodes in lead acid batteries were investigated during a single discharge and during permanent service. Theories of two phase resistor networks show an insulating behavior if there is more than a certain amount of a bad conducting phase. Results show that it is possible to describe the utilization of the electrodes during a single discharge at low current densities with these theories. The discharge is stopped by the breakdown of the electron conductivity of the active masses. A model is developed from which it is possible to calculate current distribution during discharge at low current densities. From this, conclusions are drawn as to the discharge behavior at high current densities. Author (ESA)

N83-10620# Battelle Inst., Frankfurt am Main (West Germany). Abt. Angewandte Festkoerperphysik.

RESEARCH AND DEVELOPMENT ON A MIS THIN FILM SOLAR CELL MADE OF AMORPHOUS SILICON Final Report, Jan. 1981

Hans Jaeger, Dieter Bonnet, Waltraud Roessler, Ulrich Brunsmann, and Bernd Fuessl Bonn Bundesministerium fuer Forschung und Technologie Jun. 1981 81 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-079; ISSN-0340-7608; R-64.125) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe , West Germany DM 17

The sputter deposition of a-Si : H layers was investigated, using a magnetron Si cathode. This allows working at much lower dc voltages, which is advantageous for the quality of the films. The photovoltaic characteristic of the layer is considered the crucial property and guide for the development. Photovoltaic barriers were mainly Au Schottky barriers. First structures yielded open circuit voltages of up to 570 mV and short circuit current densities of 1 mA/cm squared. Several possible improvements of the layer quality are proposed. Author (ESA)

N83-10621# Fraunhofer-Inst. fuer Angewandte Festkoerperphysik, Freiburg (West Germany).

SOLAR ENERGY CONVERSION BASED ON THE PRINCIPLE OF FLUORESCENT COLLECTORS Final Report, Oct. 1980

Guenter Baur, Adolf Goetzberger, Klaus Heider, Heinz Langhals, Ekwald Sah, Volker Wittwer, and Armin Zastrow Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 204 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-081; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 39

Fluorescent dyes and matrix materials were investigated with regard to an application in fluorescent collectors. In the visible range, dyes from the field of display applications were available. In this spectral range, the combination organic dye - plexiglass gives satisfactory results concerning efficiency as well as stability, The first collectors were tested in a long term outdoor test setup. In the red and infrared range, the properties of dyes and collectors are not yet satisfactory. Author (ESA)

N83-10622# Schott Glaswerke, Mainz (West Germany).

DEVELOPMENT OF LARGE SCALE PRODUCTION METHODS FOR COMPONENTS OF SOLAR ENERGY COLLECTION. TRANSPARENT GLASS COVERS AND THEIR CONNECTION TO THE COLLECTOR SYSTEM Final Report, Mar. 1980

Eckart Hussmann Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-083; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

The problems connected with the glass cover of flat solar collectors to be produced on a large scale are identified and solved. The glass pane cover of flat plate solar collectors and its connection to the collector can be selected only when all the mechanical and thermal stresses are known during operation. Loads from the environment as wind, snow, ice and hail were investigated. The loads due to operation as pressure rise related to temperature rise and thermal stresses are analyzed. The connection between glass panes and collector, cementing and fastening into a frame, were investigated. The effective strength of glass panes, thermally strengthened and not strengthened, is described extensively. These methods to calculate and predict the stresses in the cover plate and its connection to the collector are demonstrated by an example. Author (ESA)

N83-10623# Vereinigte Kesselwerke Duesseldorf (West Germany).

TECHNICAL STUDY ON THE POSSIBILITIES OF OIL SHALE COMBUSTION IN A FLUIDIZED BED FURNACE INCLUDING COST ESTIMATES FOR A PLANT TO BE BUILT Final Report, Jun. 1981

Manfred Kuehl and Peter Steller Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 70 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-085; ISSN-0340-7608; Rept-41.0801.43.11) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 13

The possibilities of oil shale combustion in a fluidized bed furnace were studied and the costs for a power plant were estimated. An overall concept of oil shale combustion in a fluidized bed furnace is drafted and the final plant size is established, allowing a scaling up of 200 t/hr steam. The concept was technically revised, resulting in a cost estimate of about 15% accuracy. Author (ESA)

N83-10624# Dornier-Werke G.m.b.H., Friedrichshafen (West Germany). Fachbereich Mechanik.

DEVELOPMENT OF A 5.5 M DIAMETER VERTICAL AXIS WIND TURBINE, PHASE 3 Final Report, Jun, 1982

Anton Dekitsch, Carl-Christian Etzler, Albert Fritzsche, Gerhard Lorch, Wolfgang Mueller, Kurt Rogalla, Juergen Schmelzle, Werner Schuhwerk, Arne Vollan, and Dieter Welte Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 52 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-086; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 11

In continuation of development of a 5.5 m diameter vertical axis windmill that consists in conception, building, and wind tunnel testing, a Darrieus rotor windpowered generator feeding an isolated network under different wind velocity conditions and with optimal energy conversion efficiency was designed built, and field tested. The three-bladed Darrieus rotor tested in the wind tunnel was equiped with two variable pitch Savonius rotors 2 m in diameter. By means of separate measures of the aerodynamic factors and the energy consumption, effect of revisions and optimizations on different elements was assessed. Pitch adjustement of the Savonius

blades, lubrication of speed reducer, rotor speed at cut-in of generator field excitation, time constant of field excitation, stability conditions, switch points of ohmic resistors which combined with a small electric battery simulated a larger isolated network connected with a large storage battery, were investigated. Fundamentals for the economic series production of windpowered generators with Darrieus rotors for the control and the electric conversion system are presented. Author (ESA)

N83-10625# Rheinische Braunkohlenwerke A.G., Cologne (West Germany). Abt. Forschung und Entwicklung.

PHOTOTYPE PLANT FOR NUCLEAR PROCESS HEAT (NPH), REFERENCE PHASE. R AND D WORK ON HYDROGENATED COAL GASIFICATION (HCG). FURTHER OPERATION OF SEMI-INDUSTRIAL PLANT FOR HYDROGENATED COAL GASIFICATION Final Report, Dec. 1980

Rolf Fladerer and Lothar Schrader Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 103 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-098; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 21,50

In view of a scale up, leading to a commercial HCG, further R and D work was performed on the 100 kg C/hr prototype plant. The inclined tube for feeding coal into the fluidized bed, the raw gas/hydrogenation gas heat exchanger, and the modified hydrogen source were tested. Influence on carbon gasification efficiency of dimension of coal particles, humidity of coal, hydrogen content of gasification gas, introduction place of coal in gasifier, height of fluidized bed, and ash content of coal were studied. The plant was operated for 19,400 hr, of which more than 7400 hr under gasification conditions. Carbon gasification rates up to 82% with methane content up to 48% were obtained. Author (ESA)

N83-10626# Maschinenfabrik Augsburg-Nuernberg A.G., Munich (West Germany). Abteilung EPS.

TESTS WITH CONCENTRATING COLLECTORS Final Report, Jun. 1981

Michael Kraft Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 82 p refs In GERMAN, ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-104; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17

The parabolic solar absorber Helioman 3-32/A was developed. Before going over to industrial use in large solar plants, a complete module with all auxiliary equipment was tested. The standards for acceptability and quality were established, a module of six absorbers with tracking and automatic control systems was constructed, simulation tests were conducted, and real conditions tests were run at a solar energy test center. The results of simulation tests, the calculation of foundations, the choice of the reflector material, the starting-up procedure, and the running conditions are reported. Author (ESA)

N83-10627# Institut fuer Kemtechnik und Energiewandlung e.V., Stuttgart (West Germany). Abteilung Energiewandlung und Waermetechnik.

INVESTIGATION OF HEAT STORAGE FOR TEMPERATURE RANGE FROM 200 TO 500 C Final Report, Jun. 1981

Dieter Steiner, Dietmar Heine, and Albert Nonnenmacher Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 351 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-105; ISSN-0340-7608) Avail: NTIS HC A15/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 51,60

Possible heat storage methods for a temperature range from 200 to 500 C are reviewed to obtain higher specific heat content and to work at lower pressures. Three possible storage methods: sensible heat, latent heat or reversible chemical reactions, are reviewed. The thermodynamic quality and the efficiency of the storage system are defined. The material resistance, the cost, the thermodynamic quality, and the maintenance problems of the heat storage systems are discussed. Physical characteristic figures of possible heat storage materials are given. The various storage techniques are assessed with respect to thermal power plant applications. A thermal and cost analysis was carried out for oil/solid, molten salt/solid, or latent heat storage systems. Storage in oil or in the combination oil/solid material must be considered as an alternative to hot water storage. Author (ESA)

N83-10628# Research Inst. of National Defence, Stockholm (Sweden). Systems Analysis Dept.

RUNNING HOT WATER: A SYSTEMS APPROACH TO ENERGY CONSERVATION

Petter Wulff Mar. 1982 25 p refs Sponsored by Swedish Energy Research and Development Commission

(FOA-C-10202-M2) Avail: NTIS HC A02/MF A01

Ways to conserve energy in domestic hot water systems are discussed. Examination of the Swedish situation shows that centralized systems, where water heating is a subsidiary of space heating, waste energy because water cools in the pipes after use, and the entire system must operate in summer. Also, water temperature is often much higher than required. Solar panels, individual water heaters, heat pumps, and heat exchangers could contribute to energy conservation, but changes in consumer behavior can also be extremely effective. For example, dish washing energy requirements were reduced by 80% in one neighborhood by giving each apartment a plastic bowl for washing up. Author (ESA)

N83-10629# Technische Universitaet, Brunswick (West Germany). Inst. fuer Waerme- und Brennstofftechnik.

COMPUTERIZED SIMULATION OF THE DYNAMIC RESPONSE OF A COAL-FIRED POWER PLANT WITH PRESSURIZED FLUIDIZED BED Final Report, Nov. 1981

Joachim Plackmeyer Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 45 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-094; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 9,50

The simple way of desulfurizing, the efficient combustion of coal, and low carbon monoxide flue gas content of a fluidized bed combustion installation were studied. The dynamic response of a pressurized fluidized bed should also be studied before any construction is started. The physical-mathematical models of all single components were developed and combined in a total computer program. Starting point was the planned pilot plant with gas turbine engine. Various modifications of the purely air cooled plant as well as the extension to a combined cycle with additional steam turbine were considered. Operating cases were simulated: starting up, increasing from partial load to full load and vice versa, shut down and breakdowns. Results show that all operating cases could be brought under control as well as breakdowns. The constructive precautions and correct plant practice are described. Author (ESA)

N83-10630# Gesellschaft fuer Elektrometallurgie m.b.H., Duesseldorf (West Germany).

PROCESS DEVELOPMENT FOR ECONOMICAL PROCESSNG OF VARIOUS VANADIUM BEARING MATERIALS Final Report, Apr. 1981

Hans-Joachim Retelsdorf, Hans Rothmann, and Rudolf Fichte Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 14 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung une Technologie

(BMFT-FB-T-82-097; ISSN-0340-7608) Avail: NTIS HC A02/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 3

Three different vanadium bearing products were tested. It was proven feasible to recover a ferroalloy containing 73.5% of the

vanadium contained in the leaching residues from blast furnace slags by reduction in an electric arc furnace. The composition of the obtained ferroalloy was 67% Fe, 2% V, 7% Cr, and 5.5% C. The vanadium recovery contained 0.5 to 6% in the fly ash, resulting from the combustion of fuel. Different fly ashes were tested by oxidation through roasting and subsequent basic leaching, or by reduction roasting with subsequent acid leaching, or bysoda roasting and leaching. The third source of vanadium tested was the waste salt, originating in alumina production, and containing about 4% V, 5% P, and 0.5% As. It was possible to produce a ferroalloy containing V2O5 and a secondary sodium phosphate, which could be applied in the phosphate processing industry.
Author (ESA)

N83-10631# Schaefer (Arnold) G.m.b.H., Saarwellingen (West Germany).
DRY PROCESSING OF POWER PLANT COAL RICH IN INERTS Final Report, Apr. 1981
Josef Gross and Helmut Ditzler Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 71 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-101; ISSN-0340-7608) Avail: NTIS HC A04/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 15

A system for pneumatic classifying was constructed in order to examine the effects of quality and composition of coal as well as the machine-related factors, such as the sieve shaking frequency, sieve hole size, air distribution, position of the separating weirs, and arrangement of the charging chute. It was determined that the Berry pneumatic table fulfills the requirements for product purity when the supply of material is held constant and the machine related factors are optimized. For a bituminous coal with a mean ash content between 40% and 50%, the best separation results were obtained. At a purity rate of inerts of over 97%, it was possible to reduce the ash content of the coal by 20%. Due to its compactness, the system can be put in operation at different sites. It is economic to operate, and can be adapted to any required capacity as a result of its modular design. During the tests a high degree of wear was noted on the fan and fan housing. The fan housing was protected to a great extent by synthetic plates.
Author (ESA)

N83-10632# Konstanz Univ. (West Germany). Fakultaet fuer Physik.
INVESTIGATION OF NEW SOLAR CELLS. PART A: NOVEL SEMICONDUCTORS AND THEIR SUITABILITY. PART B: POLYCRYSTALLINE MIS DIODES Final Report, Dec. 1980
Ernst Bucher and Peter Munz Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 32 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-103; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6,50

Solar cells were explored with Be, Yb, Sc, Y, Hf as barrier metals; Sc proved to be the best one. For the first time, a surface as large as three and a quater sq.cm. was obtained. It was proved that n-Si and n-Silso MIS cells with Au and Pt were inferior to p-type cells. Sintering of Si powder wafers was achieved by capacitor discharge. Photovoltaic materials as Zn3P2, Wse2, InSc were explored. Production of solar cells by MIS technology-Si-powder-cells and metallurgy methods were studied. No stable cells are yet found due to chemical surface problems. Barrier metals such as Be, Sc, Hf and related elements can be used for p-Si MIS cells with good performances. They are considerabely more stable than n-Si cells. Among alternative materials, p-WSe2 appears to be the most promising material for p/n MIS and photoelectro-chemical cells. Author (ESA)

N83-10633# Fachhochschule, Giessen (West Germany). Labor fuer Elektrische Messtechnik.
MEASUREMENT STUDIES OF A 15 KW WIND POWER PLANT Final Report, Sep. 1981
Uwe Machens Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 150 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-109; ISSN-0340-7608) Avail: NTIS HC A06/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 31,50

The process in which the wind situation and the corresponding power data of the plant are recorded from instantaneous measurements is presented. This process was applied to the study of a small wind power plant, having a propeller diameter of 15 m and a power output of 15 kW at a wind speed of 9 meters/sec. The plant assembled of standard parts feeds the power to an electricity network. The plant, the synchronizing and switching of the network, the measuring procedure and the measuring equipment are described. The results of the measurements are stated and discussed. It is shown that the plant is capable of producing the expected power output. The possibilities of increasing the power output and simplifying the synchronizing and switching of the network are also indicated. Author (ESA)

N83-10634# National Hydroelectric Power Corp. Ltd., New Delhi (India).
SEMINAR ON ACCELERATED HYDROELECTRIC DEVELOPMENT IN INDIA: PROCEEDINGS, VOLUME 1
Mar. 1981 359 p refs Conf. held in New Delhi, 5-6 Mar. 1981 Sponsored by Central Board of Irrigation and Power 2 Vol.
(PB82-217753; CBIP-Publ-150-Vol-1) Avail: NTIS HC A16/MF A01 CSCL 10B

Hydroelectric projects concentrating on adequacy, modernization, and acceleration are discussed. Planning and modern techniques of construction are also discussed. Contracts and coordination with power house equipment suppliers and contractors and data and technical information on hydroelectric development at high altitudes are presented. GRA

N83-10635# National Hydroelectric Power Corp. Ltd., New Delhi (India).
SEMINAR ON ACCELERATED HYDROELECTRIC DEVELOPMENT IN INDIA: POST SESSION PROCEEDINGS, VOLUME 2
May 1981 191 p refs Conf. held in New Delhi, 5-6 Mar. 1981 Sponsored by Central Board of Irrigation and Power 2 Vol.
(PB82-217761; CBIP-Publ-150-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 10B

Hydroelectric projects are investigated. Construction including concrete linings for tunnels and the use of laser systems in tunnelling, and powerhouse equipment suppliers and contractors are discussed. GRA

N83-10636# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
GEOTHERMAL ENERGY DEVELOPMENT IN THE UNITED STATES Final Report, 1976 - 1981
Oct. 1981 144 p refs
(Contracts DE-AL01-79ET-27025; EX-76-A-36-1008; N00024-81-C-5301)
(PB82-215146; JHU/APL/QM-81-130) Avail: NTIS HC A07/MF A01 CSCL 08I

Research on geothermal energy utilization is discussed. Topics include: developing a background in geology, hydrology, and reservoir analysis; establishing the marketability of geothermal energy; colocating users with resources; the transfer of technology; and establishing the beginnings of a geothermal industry infrastructure. Legal, institutional, and economic issues were addressed, as well as information exchange and assistance in state planning through the development of state prospectuses and scenarios.
R.J.F.

N83-10637# United Technologies Corp., South Windsor, Conn.
ON THE 40kW TEST POWER PLANT MODIFICATION AND DEVELOPMENT, PHASE 2 Annual Report
Renzo Falcinelli Chicago, Ill. Gas Research Inst. Jun. 1981

96 p Sponsored by Gas Research Inst.
(Contract DE-AC03-77ET-11302)
(PB82-216102; GRI-77/0015; FCR-2585) Avail: NTIS HC A05/MF A01 CSCL 10B

Verification testing of an improved 40 kW onsite phosphoric acid fuel cell power plant is discussed. Results showed the power plant to operate satisfactorily within the specification examined. However, additional verification testing is required. M.G.

N83-10638# Louisiana State Univ., Baton Rouge. Energy Program Office.
THE DEVELOPMENT OF A GEOPRESSURED ENERGY MANAGEMENT INFORMATION SYSTEM IN SUPPORT OF RESEARCH PLANNING, PHASE 1 Annual Report, Mar. 1980 - Oct. 1981
Ann L. Bachman and Fred Wrighton Oct. 1981 55 p Sponsored by Gas Research Inst.
(PB82-207366; GRI-81/0005) Avail: NTIS HC A04/MF A01 CSCL 10A

The development of an information system on the problems and potential of geopressured gas containing aquifers as well as what is known about unconventional gas production in the Gulf Coast, and the use of this information to formulate a research program to prove economic and technical feasibility is discussed. This work led to the conclusion that of six major conventional gas resource options in the Gulf Coast, the one involving gas recovery from reservoirs watered out due to prior production offers the greatest potential in the short term. In these water drive reservoirs, gas is trapped in the pore space as water invades the reservoir (due to gas production). This gas can be recovered by reducing the pressure in the reservoir and thereby causing the trapped gas to expand and become mobile. The reduction in reservoir pressure is achieved by high rate water production. The conclusions drawn from analyses of the potential for gas recovery from unconventional sources in the Gulf Coast as well as research and testing already completed are the basis for the proposed research program. The process by which the research program was formulated, intermediate results and the program itself are summarized. Author

N83-10639# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
OCEAN THERMAL ENERGY AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Quarterly Report, Oct. - Dec. 1981
Jan. 1982 32 p refs
(Contract DE-AI01-82ET-20342)
(PB82-215054; OQR/81-4) Avail: NTIS HC A03/MF A01 CSCL 10A

The Johns Hopkins University Applied Physics Laboratory, under a contract with the U.S. Department of Energy's Division of Ocean Energy Technology (DOE/DOET), is engaged in developing Ocean Thermal Energy Conversion (OTEC) systems that will provide synthetic fuels (e.g., methanol), energy-intensive products such as ammonia (for fertilizers and chemicals), and aluminum. The work also includes assessment and design concepts for hybrid plants, such as geothermal-OTEC (GEOTEC) plants. APL has been designated the Lead Laboratory in these areas by DOE/DOET. This Quarterly Report summarizes the work on the various tasks as of 31 December 1981. GRA

N83-10640# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
GEOTHERMAL COMMUNITY HEATING FOR CAPE CHARLES, VIRGINIA
Claude S. Leffel, Jr. Oct. 1981 28 p refs
(Contract DE-AI01-79ET-27025)
(PB82-184003; JHU/APL/QM-81-133) Avail: NTIS HC A03/MF A01 CSCL 13A

An economic feasibility study for a geothermal community heating system was made for the residential heat load of Cape Charles, Virginia using a computer program. The effects of inflation, interest rates, wellhead temperatures, and the addition of reinjection wells are investigated. It is concluded that the utilization of geothermal energy would be feasible if well flows of 500 gal/minute could be obtained and if reinjection of the geothermal fluids were not required. A comparison of the geothermal assisted community system with a coal fired system shows that the coal fired system may be the most attractive alternative to the heating of homes with individual oil fired furnaces. Author (GRA)

N83-10641# Gas Research Inst., Chicago, Ill.
SYMPOSIA ON PULSE-COMBUSTION APPLICATIONS AND CONDENSING HEAT EXCHANGERS
4 Mar. 1982 65 p Symp. held in Atlanta, 2-4 Mar. 1982 Sponsored in part by Battelle Columbus Labs., DOE and Brookhaven National Lab.
(PB82-184086; GRI-82/0009.1) Avail: NTIS HC A04/MF A01 CSCL 13A

Fuel-firing equipment designed to take advantage of the phenomena of combustion-driven pulsations is discussed. Heat exchangers that are designed to operate in the condensing mode to recover a portion of the water vapor formed in the combustion process are discussed. Author (GRA)

N83-10642# Greater Egypt Regional Planning and Development Commission, Carbondale, Ill.
IMPACT OF ALTERNATE ENERGY SOURCES IN THE GREATER EGYPT REGION: FRANKLIN, JACKSON, JEFFERSON, PERRY AND WILLIAMSON COUNTIES, ILLINOIS Final Report
Jun. 1981 142 p
(Contract EDA-06-05-11007-10)
(PB82-181090; GERPDC-81-603) Avail: NTIS HC A07/MF A01 CSCL 10A

Economic and environmental aspects of alternate energy sources for the five county Greater Egypt Economic Development District in Southern Illinois are discussed. Various energy sources available, including coal, oil, gas, coal, solar and geothermal are discussed. GRA

N83-10643# Solar Energetics, Inc., Wilmington, Del.
GEOTHERMAL ENERGY MARKET STUDY ON THE ATLANTIC COASTAL PLAIN: DOVER AIR FORCE BASE GEOTHERMAL ENERGY EVALUATION
Dec. 1981 40 p refs Prepared for Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
(Contracts N00024-81-C-5301; DE-AI01-79ET-27025)
(PB82-183997; JHU/APL/QM-81-144) Avail: NTIS HC A03/MF A01 CSCL 10A

The technical and economic feasibility of the utilization of geothermal energy was examined. Under the load, resource, and economic conditions, the geothermal evaluation is favorable. There is no prescribed method for evaluating economic feasibility. The results of one computer program was developed for technical assistance and technology transfer are shown. Other geothermal feasibility studies for site specific locations are listed. GRA

N83-11017# California Univ., Livermore. Lawrence Livermore Lab.
COMPOSITE-MATERIAL FLYWHEELS AND CONTAINMENT SYSTEMS
Satish V. Kulkarni *In its* Energy and Technol. Rev., Mar. 1982 Mar. 1982 p 18-29 (For primary document see N83-11015 01-99) Avail: NTIS HC A03/MF A01

45 ENVIRONMENT POLLUTION

Includes air, noise, thermal and water pollution; environment monitoring; and contamination control.

N83-10644 California Univ., Irvine.
DEVELOPMENT OF METEOROLOGICAL SCENARIOS FOR AIR QUALITY PLANNING USING MULIVARIATE STATISTICAL ANALYSIS OF METEOROLOGICAL AND AIR QUALITY DATA Ph.D. Thesis
Raymond Brenner Munger 1981 176 p refs

Avail: Univ. Microfilms Order No. DA8202921

The concept of meteorological scenarios for air quality planning is presented as a means for reducing the number of air quality simulations required to assess the range of impacts (e.g., low, moderate, and high pollutant levels) associated with proposed projects, control strategies, or transportation and land use plans. Past studies of meteorological scenarios related to air quality are reviewed. The methodologies utilized in these studies did not provide sufficient information on the temporal and spatial variation of the aerometric variables used to identify the scenarios. Alternative techniques for identifying meteorological scenarios are compared and evaluated for their ability to characterize meteorological scenarios in a manner appropriate for input to regional air quality models. Two multivariate statistical techniques, cluster analysis and factor analysis, are applied to a data base comprising ozone air quality data and surface wind vector data for the Los Angeles area for the 1974, 1975, and 1976 smog seasons. The aerometric data base includes several parameters developed using the dosage-area and dosage-moment concepts. Dissert. Abstr.

N83-10645*# General Electric Co., Philadelphia, Pa. Space Systems Div.

TECHNOLOGY NEEDS ASSESSMENT OF AN ATMOSPHERIC OBSERVATION SYSTEM FOR TROPOSPHERIC RESEARCH MISSIONS, PART 1 Final Report, Jul. 1980 - Mar. 1981

D. R. Alvarado, M. H. Bortner, R. N. Grenda, G. G. Frippel, H. Halsey, S. L. Neste, H. Kritikos (Pennsylvania Univ., Philadelphia), Lloyd S. Keafer (NASA, Langley Research Center), and L. J. DeRyder Washington NASA Sep. 1982 249 p refs

(Contract NAS1-16312)

(NASA-CR-3556; NAS 1.26:3556) Avail: NTIS HC A11/MF A01 CSCL 13B

The technology advancements needed to implement the atmospheric observation satellite systems for air quality research were identified. Tropospheric measurements are considered. The measurements and sensors are based on a model of knowledge objectives in atmospheric science. A set of potential missions and attendant spacecraft and sensors is postulated. The results show that the predominant technology needs will be in passive and active sensors for accurate and frequent global measurements of trace gas concentration profiles. Author

N83-10646*# General Electric Co., Philadelphia, Pa. Space Systems Div.

TECHNOLOGY NEEDS ASSESSMENT OF AN ATMOSPHERIC OBSERVATION SYSTEM FOR MULTIDISCIPLINARY AIR QUALITY/METEOROLOGY MISSIONS, PART 2 Final Report, Mar. 1981 - Feb. 1982

U. R. Alvarado, M. H. Bortner, R. N. Grenda, W. F. Brehm, G. G. Frippel, F. Alyea, H. Kraiman, P. Folder, and L. Krowitz (Krowitz (Lowell) Associates) Washington NASA Sep. 1982 252 p refs (Contract NAS1-16312)

(NASA-CR-3557; NAS 1.26:3557) Avail: NTIS HC A12/MF A01 CSCL 13B

The technology advancements that will be necessary to implement the atmospheric observation systems are considered. Upper and lower atmospheric air quality and meteorological parameters necessary to support the air quality investigations were included. The technology needs were found predominantly in areas related to sensors and measurements of air quality and meteorological measurements. Author

N83-10647*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

ANALYSIS OF HIGH ALTITUDE REMOTELY SENSED DATA COLLECTED IN THE NANTUCKET SHOALS EXPERIMENT 4-15 MAY, 1981

Craig W. Ohlhorst Sep. 1982 37 p refs

(NASA-TM-84547; NAS 1.15:84547) Avail: NTIS HC A03/MF A01 CSCL 13B

High altitude ocean color scanner ratios of band 2 (456 to 476 nanometers) to band 4 (539 to 559 nanometers) and band 1 (418 to 438 nanometers) to band 3 (498 to 518 nanometers) had high correlation coefficient values (-0.928 and 0.891 respectively) with seven boat sampled chlorophyll a measurements. The range of chlorophyll a concentrations was small (1.7-2.58 mg/cu m.). Each ratio was used to calculate chlorophyll a values for the center pixel of each scan line on flight lines 5 and 6. The two ratios produced dissimilar chlorophyll a trends. Due to the high noise level in the scanner data, no reliable synoptic chlorophyll a map could be generated with either ratio algorithm. S.L.

N83-10648*# Michigan Univ., Ann Arbor.

METEOROLOGICAL ASSESSMENT OF SRM EXHAUST PRODUCTS' ENVIRONMENTAL IMPACT Final Report

A. Nelson Dingle [1982] 50 p refs

(Grant NsG-1243)

(NASA-CR-169453; NAS 1.26:169453) Avail: NTIS HC A03/MF A01 CSCL 13B

The environmental impact of solid rocket motor (SRM) exhaust products discharged into the free air stream upon the launching of space vehicles that depend upon SRM boosters to obtain large thrust was assessed. The emission of Al2O3 to the troposphere from the SRMs in each Shuttle launch is considered. The Al2O3 appears as particles suitable for heterogeneous nucleation of hydrochloric acid which under frequently occurring atmospheric conditions may form a highly acidic rain capable of damaging property and crops and of impacting upon the health of human and animal populations. The cloud processes leading to the formation of acid rain and the concentration of the acid that then reaches the ground, and the atmospheric situations that lead to the production of cloud and rain at and near a launch site, and the prediction of weather conditions that may permit or prohibit a launch operation are studied. S.L.

N83-10649# Letterman Army Inst. of Research, San Francisco, Calif.

FIELD PRODUCTION OF PURIFIED STERILE WATER FROM AVAILABLE WATER SOURCES BY USING A PORTABLE APPARATUS

Frank Devenuto and Angelo Zegna 18 Jun. 1982 11 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117319) Avail: NTIS HC A02/MF A01 CSCL 13/2

In a normal urban environment, sterile water for injection is readily available; however, in field situations or in areas remote from supply sources, the procurement of purified water could present logistic difficulties. A 60 kg, compact, self-contained, portable water purification apparatus, adapted with a sterile micropore filter, has been evaluated for purification of sea water, pond water, or human urine. The process is based on the reverse osmosis procedure and can use various power sources. The results indicate that polluted water can be purified by a single passage through the system, as demonstrated by considerable reducton of ions (>1 percent), and complete elimination of metal content and organic matter present in the source of water. The water obtained is clear, colorless, odorless, non-pyrogenic, is made sterile without addition of antimicrobial agents or other substances, and appears to satisfy the criteria for USP grade water for injection except for the limits on total solids. The residual solids are sodium and chloride ions which are common constituents of parenteral solutions. This purification process can be used anywhere water is needed as long as a water supply from some source is available. It represents a multipurpose water purification system which is capable of meeting the medical needs of the military in its various fields of operation, and could also be very useful in many non-medical situations. GRA

N83-10650# Argonne National Lab., Ill. Water Resources Section.

SAMPLING AND DETECTION OF TAGGED DREDGED MATERIAL

L. S. VanLoon, D. L. McCown, and J. D. Ditmars Jan. 1982 34 p refs Sponsored in part by the Army Corps of Engineers

(Contract W-31-109-eng-38)

(DE82-016056; ANL/EES/TM-169) Avail: NTIS HC A03/MF A01

Systems for sampling and detecting tagged dredged sand in the Upper Mississippi River were developed by Argonne National Laboratory for the U.S. Army Corps of Engineers, Rock Island District. The Corps plans to demonstrate main-channel disposal of dredged material, and it requires systems to detect the movement of the dredged material after the material has been placed in a deep reach of river. The dredged material in the demonstration will be tagged with sand particles coated with fluorescent dye. Argonne designed systems for: sampling of the bottom surficial sediments at discrete points along transects from a boat that employs a precision navigation system; on-board visual inspection of the samples for dyed sand in an ultraviolet light box; and photography of ultraviolet-illuminates samples. This report describes the systems and their use as well as the results of tests to determine proper settings for photographic equipment. DOE

N83-10651# Schmidt Reuter Engineering Consulting Co., Cologne (West Germany).
CONSERVING ENERGY BY IMPROVING THE QUALITY OF THE AIR PURIFYING AND AIR CONDITIONING SYSTEMS Final Report, Jun. 1981
Ulrich Kniel and Walter Moog Bonn Bundesministerium fuer Forschung und Technologie May 1982 436 p refs Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-067; ISSN-0340-7608) Avail: NTIS HC A19/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 60

After reviewing different air pollution elements and their measurement methods, a definition of 'good air' quality is given, and the necessity of good air filtration is addressed. A filter system, based on the conventional adiabatic diffusion chamber, was developed and a pilot plant was constructed. The activation elements in the pretreatement stage, comprised of an ionizator, a wet surface cooler and a prehumidifier, combine with the separating elements, comprised of packing materials, an electronic collector and a cooling washer. Water analyses show that specified raw water cannot be used as usual in an air washer without purification. If osmotically purified water is used in the washing operation, an increased jet pressure may be used with a positive effect on the particle concentration in the air behind the washer. The filtering element is able to entirely eliminate SO2, to reduce nitrogen oxides to 15%, carbon oxides and dust particles to such an extent that it is possible to reduce fresh air introduction by 20%. Author (ESA)

N83-10652# Saarberg-Hoelter-Umwelttechnik G.m.b.H., Saarbruecken (West Germany).
RECONSTRUCTION AND TESTING OF THE FLUE GAS DESULFURIZING PLANT: WEIHER 2 Final Report, May 1981
Heinrich Igelbuescher, Heinrich Gresch, Wolfgang Fischer, Steffen Miersch, and Friedrich Hofmann Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 133 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-108; ISSN-0340-7608) Avail: NTIS HC A07/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 28

Cleaning flue gas produced by the combustion of chloride rich combustibles was studied. A secondary water disposal problem arises due to the chloride content if industrial usable gypsum is produced. If the washing water is recycled, its calcium chloride content concentrates till precipitation occurs. A test program was conducted to control increasing chloride concentration through off-watering small quantities of the washing water, and to produce an optimal gypsum quality. The off-water which contained 30% by weight of calcium chloride was centrifuged for the recovery of the gypsum and the calcium chloride was then eliminated by crystallization through steam evaporation. Gypsum with a residual humidity of less than 10% by weight of free water, and calcium chloride 99% pure were obtained in nearly all test runs. Optimal operation of the washing fluid with a calcium chloride content from 10% to maximum 20% by weight of CaCl2 is feasible to obtain the requirements of the gypsum industry, namely less than 10% water and less than 0.01% Cl, and at the same time produce usable CaCl2. Author (ESA)

N83-10653# Lenox Inst. for Research, Inc., Mass.
FIRST FULL-SCALE FLOTATION PLANT IN THE USA FOR PORTABLE WATER TREATMENT Engineering Report, Jun. 1981 - Mar. 1982
Milos Krofta (Krofta Engineering Corp.) and Lawrence K. Wang 29 Mar. 1982 75 p refs Presented at US Senate Comm. on Environ. and Public Works, Washington, D.C., 29 Mar. 1982
(PB82-220690; LIR/03-82/3) Avail: NTIS HC A04/MF A01 CSCL 13B

A full scale water treatment plant (SANDFLOAT) involving the use of flotation technology was constructed. The unit processes include: chemical mixing, flocculation, dissolved air flotation, sand filtration and post chlorination. Data on the existing system, public health problems, water resources, water quality, economical feasibility study, and technical feasibility are presented. Construction of the full scale Lenox Water treatment Plant is also introduced. The innovative plant can remove color, turbidity, heavy metal, trihalomethane (chloroform), trihalomethane precursors (humic acid), etc., and is affordable by small communities. Author (GRA)

N83-10654# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air, Noise and Radiation.
COMPILATION OF AIR POLLUTANT EMISSION FACTORS, SUPPLEMENT 12
Apr. 1981 192 p refs
(PB82-184722; AP-42-Suppl-12) Avail: NTIS HC A09/MF A01 CSCL 13B

Revised or updated data are presented for dry cleaning: surface coating; storage of organic liquids; solvent degreasing; graphic arts; consumer/commercial solvent use; sulfuric acid; beer making; ammonium sulfate; primary aluminum; secondary aluminum; gray iron foundries; steel foundries; secondary zinc; asphaltic concrete; asphalt roofing; NEDS source classification codes and emission factor listing; and table of lead emission factors. Author

N83-10655# San Diego State Univ., Calif. Dept. of Biology.
THE ECOLOGY OF SOUTHERN CALIFORNIA COASTAL SALT MARSHES: A COMMUNITY PROFILE
Joy B. Zedler Mar. 1982 123 p refs
(PB82-205717; FWS/OBS-81/54) Avail: NTIS HC A06/MF A01 CSCL 08A

Coastal wetlands in Southern California are characterized. Intertidal marshes are described. The plant and animal life is discussed. Management problems are discussed. Author (GRA)

N83-10656# Federal Coordinating Council for Science, Engineering and Technology, Washington, D. C.
NATIONAL MARINE POLLUTION PROGRAM PLAN. FEDERAL PLAN FOR OCEAN POLLUTION RESEARCH, DEVELOPMENT AND MONITORING. FISCAL YEARS, 1981 - 1985
Sep. 1981 217 p refs
(PB82-218462; NOAA-82042702) Avail: NTIS HC A10/MF A01 CSCL 13B

This plan represents the second biennial milestone in the continuing interagency planning process called for by the National Ocean Pollution Planning Act of 1978. It summarizes accomplishments that have occurred since the first Federal Plan was published in the fall of 1979, describes priorities of future pollution activities and presents a strategy for improving the National Program. This plan identified opportunities for interagency collaboration and cooperation, and points out research area that are worthy of special attention. Specifically, the plan: describes marine pollution areas that are being addressed by Federal activities; within areas of concern identifies research topics that require additional effort, and those that have been adequately addressed; describes the relative importance of research in each area of concern by discussing existing information gaps, potential severity of the pollution problem, and Federally mandated functions; and presents specific recommendations for improving the program by redirecting existing resources toward the most productive and important areas,

improving interagency coordination, or anticipating future problem. GRA

N83-10657# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air Quality Planning and Standards.
FUGITIVE EMISSION SOURCES OF ORGANIC COMPOUNDS: ADDITIONAL INFORMATION ON EMISSIONS, EMISSION REDUCTIONS, AND COSTS
Apr. 1982 258 p refs
(Contract EPA-68-02-3058)
(PB82-217126; EPA-450/3-82-010) Avail: NTIS HC A12/MF A01 CSCL 13B

Standards of performance to contol fugitive emissions of volatile organic compounds (VOC) from new, modified, and reconstructed process units were proposed. The data and methodologies were characterized fugitive emission rates of VOC, effectiveness of control techniques, and control costs are presented. Author (GRA)

N83-10658# Rhode Island Univ., Kingston.
THE ECOLOGY OF NEW ENGLAND HIGH SALT MARSHES: A COMMUNITY PROFILE
Scott W. Nixon Mar. 1982 85 p refs
(PB82-217118; FWS/OBS-81/55) Avail: NTIS HC A05/MF A01 CSCL 13B

The history of New Englanders' impact on high salt marshes is traced from their use of marshes as hay fields to depositories of pollutants. Habitat management considerations today include mosquito control and sewage sludge treatment. Author (GRA)

N83-10659# Connecticut Univ., Noank. Marine Research Lab.
THE ECOLOGY OF NEW ENGLAND TIDAL FLATS: A COMMUNITY PROFILE
Robert B. Whitlatch Mar. 1982 139 p refs
(PB82-217100; FWS/OBS-81/01) Avail: NTIS HC A07/MF A01 CSCL 13B

A general perspective of tidal flats of New England, the organisms commonly associated with them and the importance of tidal flats to the coastal zone viewed as a whole are provided. The approach is taxonomically based although there is also attention paid to the flow of organic matter through the tidal flat habitat. A general view of the physical, chemical, and geological characteristics of tidal flat environments is followed by a discussion of organic production and decomposition processes vital to these systems. The benthic invertebrates, fishes, and birds common to the New England tidal flats are discussed. The response of tidal flats to environmental perturbation as well as their value to the New England coastal zone is considered. Author (GRA)

N83-10660# Kentucky Univ., Lexington. Water Resources Research Inst.
SUNLIGHT INDUCED MOVEMENT OF PLANKTONIC ORGANISMS AND THEIR RELATIONSHIPS TO WATER MOVEMENTS Report, Oct. 1979 - Feb. 1982
John Calkins, Ed Colley, Jay Wallingford, Carol Hulsey, Kathy Lohr, and Marc Bolling 1982 2 p refs
(Contracts DI-14-34-0001-0119; DI-14-34-0001-1119)
(PB82-211509; RR-132) Avail: NTIS HC A02/MF A01 CSCL 13B

It is proposed that the circulation in natural waters is such that organisms can ride the current to obtain radiation exposures approximating the average radiation level of the euphotic zone. If exposure tends to become excessive, the plankton drop out of the circulation into the relatively immobile thermocline region until conditions are favorable for a return to the highly illuminated surface waters. Observations with two species of aquatic plants generally confirm the proposed model. A radiation regime where the entire population receives essentially the same exposure to sunlight could be substantially more efficient in using the available light for photosynthesis than the static model where it is assumed that part of the population is overly exposed and another segment continuously dwells deep in the water in very dim light. Author (GRA)

N83-10661# Maryland Academy of Sciences, Baltimore.
ENVIRONMENTAL RESEARCH GUIDING COMMITTEE REPORT Annual Report, 1 Jan. - 31 Dec. 1981
Jan. 1982 53 p
(PB82-220070; PPRP-57) Avail: NTIS HC A04/MF A01 CSCL 13B

Eighteen collections of planted oysters were made from effluent and control stations of two power plant sites in the mid-Atlantic region. A power plant in the middle reaches of a polyhaline salinite regime and a plant in an oligohaline-mesohaline salinity regime on the Potomac River were selected for the study of various aspects of the life history of the oyster and the effects of temperature-salinity interactions in the mid-Atlantic region. Study variables include mortality, shell growth, percent solids and glycogen (condition), timing and level of reproduction and incidence of parasites, commensals and abnormal growths. In addition, comparisons were made with other similar Atlantic and Gulf Coast studies in an attempt to reconcile apparently conflicting data. Input to power plant siting decisions in the Chesapeake Bay area is emphasized. GRA

N83-10662# Rexnord, Inc., Milwaukee, Wis. Environmental Research Center.
EVALUATION OF SECONDARY ENVIRONMENTAL IMPACTS OF URBAN RUNOFF POLLUTION CONTROL
Kathryn R. Huibregtse and Anthony Geinopolos Mar. 1982 123 p refs
(Contract EPA-68-03-2574)
(PB82-230319; EPA-600/2-82-045) Avail: NTIS HC A06/MF A01 CSCL 13B

A generalized evaluation of the impacts associated with different urban stormwater runoff (UR) treatment techniques is presented. It addresses the definition of the problem, estimates the volume and characteristics of the UR and the sludges expected, evaluates six methods of UR sludge treatment, and examines alternatives and impacts for UR treatment sludge handling such as bleed/pump back to the dry weather plant, and land disposal. Regarding bleed/pump back of UR sludges, solids deposition in sewers and overload to the dry weather facilities are anticipated to cause problems. The most cost effective sludge treatment alternative appeared to be lime stabilization followed by thickening, pressure filter dewatering, and landfill disposal. Secondary impacts included costs, water quality, noise, energy consumption, air pollution, and land area requirements. Author

N83-10663# Environmental Protection Agency, Ann Arbor, Mich. Office of Mobile Source Air Pollution Control.
DETERMINATION OF A RANGE OF CONCERN FOR MOBILE SOURCE EMISSIONS OF HYDROGEN SULFIDE
Jan. 1982 38 p refs
(PB82-201773; EPA-AA-CTAB-PA-82-7) Avail: NTIS HC A03/MF A01 CSCL 13B

Mathematical models that were designed for various exposure scenarios (such as enclosed spaces, expressways, and street canyons) were used to calculate the ambient air concentrations resulting from various mobile source hydrogen sulfide emission factors (grams/mile). A literature search was conducted to aid in the determination of the final range of concern. The results of this analysis provide a range of concern for ambient hydrogen sulfide concentrations of 0.03 mg/cu m to 14.0 mg/cu m. This corresponds to motor vehicle emission levels of from 10.5 to 4,900 mg/mile to 958.5 to 447,300 mg/mile on the road and 0.04 to 204 mg/min to 3.8 to 1,770 mg/min for garages, depending on the type of scenario chosen to represent public exposure. Under nonmalfunction conditions or when the malfunction does not cause a rich mixture, high catalyst temperature and low exhaust space velocity, the resulting H2S emissions are negligible (below the range of concern for any scenario). GRA

N83-10664# Field (Ralph M.) and Associates, Westport, Mass.
STATE AND LOCAL ACQUISITION OF FLOODPLAINS AND WETLANDS: A HANDBOOK ON THE USE OF ACQUISITION IN FLOODPLAIN MANAGEMENT

Sep. 1981 143 p refs Sponsored by the US Water Resources Council
(PB82-284805) Avail: NTIS HC A07/MF A01 CSCL 13B

Information needed to develop a floodplain-wetland acquisition program appropriate to local needs, and to resolve some of the problems encountered in implementing acquisition programs is given. The acquisition of developed and undeveloped floodplains and wetlands to reduce future flood losses and protect natural values is discussed. An overview of floodplain acquisition that can be used to help determine if acquisition is appropriate in a particular situation is given. Ten case histories of floodplain acquisition programs are given. GRA

N83-10665# National Academy of Sciences - National Research Council, Washington, D. C. Motor Vehicle Nitrogen Oxides Standard Committee.
NO SUB X EMISSION CONTROL FOR HEAVY DUTY VEHICLES: TOWARD MEETING A 1986 STANDARD Final Report
1981 130 p refs
(Contract EPA-68-01-6188)
(PB82-183880; ISBN-0-309-03226-1) Avail: NTIS HC A07/MF A01 CSCL 13B

The technological feasibility of meeting a more stringent standard for nitrogen oxides (NOX) emissions by 1986 was studied. The impact of emission control technologies on the cost, efficiency, and performance of heavy duty engine vehicles and their impact on other potentially hazardous engine emissions was investigated. The scientific, technical, and cost issues raised by NOx emission controls for heavy duty vehicles of model year 1986 are analyzed. Several policy questions arising from the technical findings in this study are noted and it is suggested that these questions be considered in a rulemaking procedure. GRA

N83-10666# Water Resources Council, Washington, D.C.
GROUNDWATER MANAGEMENT: DISCUSSION OF ISSUES. REPORT OF THE INTERSTATE GROUNDWATER TASK FORCE PREPARED BY THE US WATER RESOURCES COUNCIL
Sep. 1981 43 p refs
(PB82-181637) Avail: NTIS HC A03/MF A01 CSCL 13B

Issues pertinent in the management of the Nation's groundwater resources are discussed. The discussion could serve as a starting point for future deliberation on groundwater resources management issues. Since groundwater resources are interrelated with surface water and the land-physically, economically, politically, and administratively-groundwater resources management is an institutional and political process greatly dependent on a large body of physical and social data. The findings and issues identified should be considered as points of departure for closer study and investigation. Accordingly, no recommendation for any type of action by Federal agencies or federally-sponsored organizations appears. GRA

N83-10667# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
COUPLED NEAR AND FAR FIELD THERMAL PLUME ANALYSIS USING FINITE ELEMENT TECHNIQUES Final Report
John Taylor Kaufman and E. Eric Adams Oct. 1981 27 p refs Sponsored in part by the Northeast Utilities Service Co. and New England Power Company
(PB82-180316; MIT-EL-81-036) Avail: NTIS HC A03/MF A01 CSCL 13B

A methodology was developed to combine the attributes of both near and far field thermal models. A finite element far field code calculates both the circulation and heat distribution over a large area of the domain. From the far field coarse grid, a semicircular area is removed which corresponds to the near field region of the discharge. At the new edge of the domain, which represents the near-far field boundary, mass flux and temperature boundary conditions are specified which simulate both the discharge into and entrainment out of the domain resulting from the surface discharge jet. GRA

N83-10668# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
BEHAVIOR OF BUOYANT MOIST PLUMES IN TURBULENT ATMOSPHERES Final Report
Redouane Hamza and Michael W. Golay Jun. 1981 405 p refs Sponsored by Northeast Utilities Service Corp.
(PB82-180241; MIT-EL-81-020) Avail: NTIS HC A18/MF A01 CSCL 13B

A model of buoyant moist plumes in turbulent atmospheres was constructed. To achieve this a one dimensional Planetary Boundary Layer (PBL) model was developed to account for atmospheric turbulence while the two dimensional time dependent fluid mechanics equations which govern plume behavior are numerically integrated. A cloud microphysics model was incorporated into the basic numerical code to account properly for the water content of the plume. The buoyancy source in the plume include both the sensible heat and the latent heat absorbed or released in the plume. The model is validated against complex field cases to demonstrate its ability to reproduce solutions to problems that are known. Comparisons to visible plume data show that both the dynamics of the plume are calculated with an acceptable accuracy. Comparisons with conventional entrainment model show that the model can simulate plumes better since it takes into account more physical phenomena. GRA

N83-10669# Massachusetts Inst. of Tech., Cambridge. Energy Lab.
CONTROL OF NO SUB X BY COMBUSTION PROCESS MODIFICATIONS Final Report
Janos M. Beer, Malcolm T. Jacques, and W. F. Farmayan Apr. 1981 173 p Sponsored in part by Northeast Utilities Service Co., New England Power Service Co., Consolidated Edison Co. of N.Y., and Southern California Edison Co.
(PB82-180175; MIT-EL-81-001) Avail: NTIS HC A08/MF A01 CSCL 13B

Lower bounds of NO sub x emission from staged combustion of a 0.7% N #6 fuel oil was determined. Aerodynamically complex industrial type turbulent flames in thermal and chemical environments similar to those in utility boiler furnaces were studied. The primary stage fuel equivalence ratio, the flow and mixing pattern in the flame, the level of air preheat and the mode and quality of fuel atomization, were varied to determine their effect upon the NO sub x and combustibles emission. Flame studies established baseline data for comparison with those obtained in fuel rich lean staged flames in which a fuel rich stage was formed near the burner and the lean stage was established by the admixing of the rest of the combustion air at a distance farther downstream. It is shown that in the fuel rich zone of the flame the fuel bound nitrogen compounds (FBN) can be converted to molecular nitrogen N2, which renders the FBN innocuous for forming NO sub x in the lean stage of the flame. GRA

N83-10670# Environmental Protection Agency, Research Triangle Park, N.C. Office of Air, Noise and Radiation.
REVIEW OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS FOR PARTICULATE MATTER: ASSESSMENT OF SCIENTIFIC AND TECHNICAL INFORMATION Final Report
Jan. 1982 274 p refs
(PB82-177874; EPA-450/5-82-001) Avail: NTIS HC A12/MF A01 CSCL 13B

Available scientific and technical information that the Environmental Protection Agency (EPA) staff believes is most relevant to the review of the National Ambient Air Quality Standards for Particulate Matter is evaluated and interpreted and presents staff recommendations on alternative approaches to revising the standards. The assessment is intended to bridge the gap between the scientific review in the EPA criteria document for particulate matter and sulfur oxides and the judgements required of the Administrator in setting ambient air quality standards for particulate matter. Recommendations are given. GRA

N83-10671# National Oceanic and Atmospheric Administration, Washington, D. C.

OCEAN DUMPING MONITORING AND RESEARCH, JANUARY THROUGH DECEMBER 1979 Annual Report to the Congress
Oct. 1981 41 p
(PB82-176231; NOAA-82012201; AR-7) Avail: NTIS HC A03/MF A01 CSCL 13B

A summary of the results of 1979 National Oceanic and Atmospheric Administration monitoring and research efforts under Section 201, Title II, of the Marine Protection, Research and Sanctuaries Act of 1972 (PL 92-532) is given. The areas studied during 1979 were two deepwater industrial waste dumping sites, two sewage sludge disposal sites, and three dredged material dumping areas. Emphasis was placed upon movements of dumped wastes at and around disposal areas, and upon the response of the ocean and its living resources to waste dumping. Knowledge of those responses will be crucial when comparing the environmental consequences of ocean dumping to those of other waste disposal technologies to establish long term waste management strategies. Author (GRA)

N83-10672# Illinois State Water Survey, Champaign.
WATER CHEMISTRY OF THE ILLINOIS WATERWAY
V. Kothandaraman, Robert A. Sinclair, and Ralph L. Evans 1981 28 p refs
(PB82-181108; ISWS/CIR-147/81) Avail: NTIS HC A03/MF A01 CSCL 13B

A 2-year field sampling effort was undertaken to collect water chemistry data along the Illinois Waterway. Twenty-eight sampling locations were established at approximately 10-mile intervals covering a stretch of about 270 miles of the waterway. Observations and sample collections were made to determine temperature, dissolved oxygen, turbidity, pH, alkalinity, hardness, chlorides, total solids, suspended solids, orthophosphate-phosphorus, total phosphate-phosphorus, ammonium-nitrogen, and nitrate-nitrogen. The water in the Illinois Waterway was found to be typical of the water in most midwestern rivers: high alkalinity, total solids, and hardness. Long-term average mineral and nutrient transports by the Illinois River at three U.S. Geological Survey gaging stations on the waterway were evaluated. Nitrate flux at these locations was found to vary from 8.88 to 13.83 pounds per acre per year. Phosphorus flux varied from 1.20 to 2.96 pounds per acre per year. GRA

N83-10673# Environmental Sciences Research Lab., Research Triangle Park, N.C. Meteorology and Assessment Div.
METEOROLOGY AND AIR QUALITY MODELING IN COMPLEX TERRAIN: A LITERATURE REVIEW
Gerard A. Demarrais and Terry L. Clark Apr. 1982 116 p
(PB82-200247; EPA-600/3-82-040) Avail: NTIS HC A06/MF A01 CSCL 13B

Modeling air quality in complex terrain has been and remains to be a difficult task simply because of the difficulty in parameterizing the complex wind flow regimes. Due to the complex terrain, significant submesoscale forces are established to perturb the mesoscale wind field. These forces must first be better understood and the algorithms must be developed to adequately simulate the effects of these forces before one can hope to reasonably model air quality in complex terrain. This literature review summarizes over 250 studies of meteorology and air quality modeling in complex terrain for the benefit of those who wish to broaden their knowledge of the subject. Author

N83-10586# WED Enterprises, Glendale, Calif.
WATER HYACINTH WASTEWATER TREATMENT SYSTEM
B. R. Schwegler, Jr. and C. A. Lee *In* Argonne National Lab. Proc. of the US Dept. of Energy/Argonne Natl. Lab. Contractors' Res. and Develop. Workshop Feb. 1982 p 110-125 refs (For primary document see N83-10578 01-44)
Avail: NTIS HC A16/MF A01

46 GEOPHYSICS

Includes aeronomy; upper and lower atmosphere studies; ionospheric and magnetospheric physics; and geomagnetism.

For space radiation see *93 Space Radiation.*

N83-10674*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
SIGNAL ANALYSIS AND ERROR ANALYSIS STUDIES FOR A GEOPOTENTIAL RESEARCH MISSION (GRM)
W. D. Kahn and T. L. Felsentreger Jul. 1982 19 p refs
(NASA-TM-83970; NAS 1.15:83970) Avail: NTIS HC A02/MF A01 CSCL 08N

The signal characteristics and the geopotential parameter recovery capability of the SST Doppler sensor flown on the geopotential research mission (GRM) are discussed. Simulation studies of the velocity profiles resulting from the perturbation produced by a 1 deg/w/1 deg, 1 mgal anomaly as sensed by two GRM spacecraft orbiting altitudes of 160 km and 200 km respectively are described. It was found that the amplitude of the gravity signal drops off by a factor of 1.5 when going from an altitude of 160 km to 200 km. By extrapolation the signal amplitude is further decreased by a factor of 3 when the orbital altitude is increased to 250 km. Thus the amplitude of the measurement drops off as the altitude is increased to the point where it is insignificant at the 1 mgal level for altitudes above 200 km. Spectral analysis results show that for a GRM mission altitude of 160 km and a system precision of 1 micrometer/sec, gravity field information can be sensed up to 230 cycles per orbital revolution - beyond that frequency the gravity signal is characterized by white noise. It follows that at the GRM mission altitude of 160 km and a satellite to satellite Doppler system precision of 1 micrometer per second, 1/1 deg gravity and geoid anomalies can be determined to an accuracy of 3.4 mgals and 8.6 cm respectively. Author

N83-10675*# Massachusetts Inst. of Tech., Cambridge.
SEISMICITY AND ACTIVE TECTONICS OF THE ANDES AND THE ORIGIN OF THE ALTIPLANO Semiannual Status Report, 1 Sep. 1980 - 28 Feb. 1981
Peter Molnar and B. Clark Burchfiel 7 Oct. 1982 6 p
(Grant NAG5-19)
(NASA-CR-169362; NAS 1.26:169362) Avail: NTIS HC A02/MF A01 CSCL 08A

Shallow and intermediate depth earthquakes and crustal movements in the Andes Mountains of Peru are discussed. Epicenters of major seismic events are shown on charts. Microearthquakes are mapped on a chart. R.J.F.

N83-10676# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE DETERMINATION OF GEOIDAL WAVES USING SPHERICAL HARMONICS M.S. Thesis - December 1981 [DETERMINACAO DAS ONDULACOES DO GEOIDE ATRAVES DE HARMONICOS ESFERICOS]
Walter da Silva Prado May 1982 99 p refs In PORTUGUESE; ENGLISH summary
(INPE-2399-TDL/087) Avail: NTIS HC A05/MF A01

Geoidal undulations were calculated. The geoidal potential was determined through various known stations at several locations on the Earth's surface. The ellipsoid SAD-69 was considered as an equipotential with the same potential as the geoid and with its geometric center coinciding with the earth's center of mass. The geoidal undulations thus obtained were called geocentric undulations. Undulations in two deg intervals of latitude and longitude, which permitted making a geoidal map of Brazil, were calculated. Dissert. Abstr.

N83-10677# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
THE MEASUREMENT OF X RAYS 30 KeV IN THE BRAZILIAN MAGNETIC ANOMALY WITH OMNIDIRECTIONAL DETECTORS [MEDIDAS DE RAIOS-X 30 KeV COM DETETORES ONI

DIRECIONAIS NA ANOMALIA MAGNETICA BRASILEIRA]
O. Pinto, Jr., A. W. L. Gonzales, A. L. D. deGonzales, I. M. Martin, S. L. G. Dutra, I. R. C. A. Pinto, A. E. C. Pereira, and R. Senador Jul. 1982 15 p refs In PORTUGUESE; ENGLISH summary Presented at the 34th Ann. Meeting of SBPC Sponsored by National Fund for Scientific and Technological Development (INPE-2473-PRE/162) Avail: NTIS HC A02/MF A01

Atmospheric X-Rays measurements, with energies > or = 30 KeV, were performed at Sao Jose dos Campos-Brazil (23 S, 46 W Geographic) on April 14 and December 19, 1981, using omnidirectional NaI (Tl) scintillation counters on board stratospheric balloons. The main purpose of these measurements is to study the dynamics of precipitating electrons at the Brazilian Magnetic Anomaly. Studies on similar measurements during the previous decade seemed to show the existence of approx. 100 KeV precipitating electrons, possibly related to a coulomb scattering with the atmosphere. The studies on the recent measurements try not only to confirm such indications, but also to show further features of the dynamics of precipitating electrons, mainly during magnetically active time intervals. During such intervals, more energetic electrons (up to approx. 1000 KeV) also seem to precipitate, probably due to resonant wave-particle interactions at the low latitude inner magnetosphere. The collected data during the recent measurements seem to indicate the existence of such interactions. B.W.

N83-10678# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
A STUDY OF IONOSPHERIC IRREGULARITIES IN THE F REGION IN THE EQUATORIAL IONOSPHERE OVER FORTALEZA, NATAL, AND CACHOEIRA, PAULISTA M.S. Thesis [UM ESTUDO DAS IRREGULARIDADES IONOSFERICAS DA REGIAO F, NA IONOSFERA EQUATORIAL SOBRE FORTALEZA NATAL E CACHOEIRA PAULISTA]
Rui Tertuliano deMedeiros Jul. 1982 98 p refs
(INPE-2459-TDL/095) Avail: NTIS HC A05/MF A01

An investigation of the equatorial F region ionospheric irregularities is carried out based on detailed analysis of ionograms from the magnetic equatorial station, Fortaleza, Brazil, and from the low latitude station, Cachoeira Paulista, Brazil, together with geostationary satellite signal scintillation data collected at Natal, Brazil. Data from the year 1978 were used. Range type spread F was observed with higher occurrence rate between 19:00 and 00:00 LT, with a seasonal maximum during the Southern Hemisphere summer and equinoctial months, whereas the frequency type spread F presents higher occurrence rate in the post midnight hours with seasonal maximum in winter months. The range type spread F occurrence is found to be closely related to the vertical movement of the F layer near sunset, and the irregularities giving rise to the range type spread F seems to be associated with plasma depleted regions, or plasma bubbles, generated from growth of the collisional Rayleigh-Taylor type plasma instability in the equatorial ionosphere following the sunset. The plasma bubbles over the magnetic equator occur in field aligned tubular forms extending hundreds of kilometers into the low latitude ionosphere and is associated with vertical velocities 50 m/s up to 300 m/s.
Author

N83-10679# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
THE INFLUENCE OF THE ATMOSPHERIC OZONE LAYER ON THE FORMATION OF LAYER D OF THE IONOSPHERE AT SUNRISE [A INFLUENCIA DA CAMADA ATMOSFERICA DE OZONIO NA FORMACAO DA CAMADA D DA IONOSFERA AO AMANHECER]
Rene A. Medrano, Liliana R. Piazza, and M. A. Abdu Jul. 1982 17 p refs In PORTUGUESE; ENGLISH summary Presented at tne 34th Ann. Meeting of SBPC Sponsored in part by the National Fund for Scientific and Technological Development (FNDCT) (INPE-2487-PRE/171) Avail: NTIS HC A02/MF A01

Phase data of 13,6 Khz VLF signal, transmitted from Golfo Nuevo, Argentina (43 S, 65 W), and recorded in Atibaia, SP (23 S, 46 W), together with atmospheric ozone measurements from Dobson spectrophotometers located in Cachoeira Paulista, SP (22 S, 45 W) and Natal, RN (4 S, 36 W) are analyzed. A possible influence of the atmospheric ozone layer on the sunrise of the ionospheric D layer is studied. A reasonably good correlation between fluctuation in the total ozone content over Cachoeira Paulista and the sunrise phase transition of the VLF signal is found. This represents experimental evidence that the solar ultraviolet radiation (in specific wavelengths), which is absorbed in the ozone layer, is mainly responsible for the D layer at these times. Also, these correlations seem to occur, in general, with one day delay in the VLF fluctuation, as compared to those in the ozone, during the first half of the year, and advanced in the second half. This last result suggests an annually recurrent behavior in the horizontal transport of the atmospheric ozone. S.L.

N83-10680*# Johann-Wolfgang-Goethe-Universitat, Frankfurt am Main (West Germany). Inst. fuer Meteorologie und Geophysik.
CONVECTIVE THINNING OF THE LITHOSPHERE: A MECHANISM FOR RIFTING AND MID-PLATE VOLCANISM ON EARTH, VENUS, AND MARS
Tilman Spohn and Gerald Schubert (California Univ., Los Angeles) 1 Jul. 1982 44 p refs Revised
(Grant NsG-7315)
(NASA-CR-169434; NAS 1.26:169434) Avail: NTIS HC A03/MF A01 CSCL 08G

Thinning of the Earth's lithosphere by heat advected to its base is a possible mechanism for continental rifting and continental and oceanic mid-plate volcanism. It might also account for continental rifting-like processes and volcanism on Venus and Mars. Earth's continental lithosphere can be thinned to the crust in a few tens of million years by heat advected at a rate of 5 to 10 times the normal basal heat flux. This much heat is easily carried to the lithosphere by mantle plumes. The continent is not required to rest over the mantle hot spot but may move at tens of millimeters per year. Because of the constant level of crustal radioactive heat production, the ratio of the final to the initial surface heat flow increases much less than the ratio of the final to initial basal heat flow. For large increases in asthenospheric heat flow, the lithosphere is almost thinned to the crust before any significant change in surface heat flow occurs. Uplift due to thermal expansion upon thinning is a few kilometers. The oceanic lithosphere can be thinned to the crust in less than 10 million years if the heat advection is at a rate around 5 or more times the basal heat flow into 100 Ma old lithosphere. Uplift upon thinning can compensate the subsidence of spreading and cooling lithosphere.
Author

N83-10681 Illinois Univ. at Urbana-Champaign, Savoy.
A STUDY OF THE EASTERN ATLANTIC INTERTROPICAL CONVERGENCE ZONE: COMPOSITE STRUCTURE AND INITIATION OF ORGANIZED CONVECTION Ph.D. Thesis
James Patrick Russell 1981 256 p
Avail: Univ. Microfilms Order No. DA8203573

Data obtained in the GATE experiment during the summer of 1974 were analyzed to obtain the composite structure of the Intertropical Convergence Zone (ITCZ) in the Eastern Atlantic. The composite was based upon the location of the surface confluence line. Separate composites were made for disturbed and suppressed cases in each of the three data collection phases. The results show relatively little difference between disturbed and suppressed conditions as far as the overall structure is concerned. The disturbed cases show a cold core structure in the upper levels that is not present in the suppressed composites. Relatively strong meridional inflow is present at 700 mb in the disturbed composites illustrating the dominant effect the African wave has on the modulation of convection. Phase to Phase variations were most dramatic in the direction of prevailing outflow winds near 200 mb.
Dissert. Abstr.

N83-10682 Maryland Univ., College Park.
A NUMERICAL STUDY ON THE INTERACTION OF ATMOSPHERIC INTERNAL GRAVITY WAVES AND CUMULUS CONVECTION Ph.D. Thesis
Jae-Krung Eom Schemm 1981 127 p
Avail: Univ. Microfilms Order No. DA8205266

The interaction between internal gravity waves and cumulus convection is investigated using a non-linear, two dimensional numerical model of the atmosphere. The length and time scales of gravity wave modes generated by the model are controlled by a careful selection of the input wavelength and static stability parameter. As a feedback, the latent heat release and detrained cloud moisture resulting from the parameterized convection modify the temperature and moisture distributions in the mesoscale environment, and induce changes in wave characteristics. The major conclusions drawn from this investigation are: (1) Internal gravity wave propagation through a convectively unstable atmosphere induces mesoscale convective activity. (2) The presence of moisture and latent heat released by convection contribute to decrease the wave propagation speed. The reduction in propagation speed is larger for faster speeds. (3) Convection accompanying the wave modes generates an intense, self-sustaining mesoscale convective system where there exists a continucus supply of moist air. Dissert. Abstr.

N83-10683 Michigan Univ., Ann Arbor.
THE MG PLUS AIRGLOW IN THE LOW LATITUDE IONOSPHERE: OBSERVATIONS AND THEORETICAL MODELLING Ph.D. Thesis
Cassandra Garay Fesen 1981 244 p
Avail: Univ. Microfilms Order No. DA8204645

The F region metal ion morphology is studied because the long lived ions are tracers of the dynamical processes operating in this region. The behavior of Mg(+) was inferred from the 2800 A resonance emission observed by the visible airglow experiment on the Atmosphere Explorer E satellite. Observations were obtained during northern winter, solar maximum conditions. A two dimensional inversion technique was developed which produces altitude profiles of the number density of the emitting species, referenced to geographic position, from column brightnesses observed by spinning satellites. The Mg(+) altitude profiles, restricted to the range of 300 to 475 km, revealed the presence of relatively large number densities which were nearly constant in altitude. Dissert. Abstr.

N83-10684*# Wyoming Univ., Laramie. Dept. of Physics and Astronomy.
SOFTWARE SYSTEM FOR REDUCING PAM-2 DATA Final Report
Theodore J. Pepin Oct. 1982 34 p refs
(Contract NsG-1518)
(NASA-CR-169458; NAS 1.26:169458) Avail: NTIS HC A03/MF A01 CSCL 04A

A software system for reducing PAM-II data was constructed. The data reduction process concatenates data tapes; determines ephemeris; and inverts full sun extinction data. Tests of this data reduction process show that PAM-II data can be compared with data from other, similar satellites. S.L.

N83-10685# Army Engineer Topographic Labs., Fort Belvoir, Va. Research Inst.
GRAVITY VECTOR DETERMINATION FROM INERTIAL AND AUXILIARY DATA AND POTENTIAL UTILIZATION OF GENERATED VECTOR COMPONENT INFORMATION
H. Baussus von Luetzow 18 Jun. 1982 18 p refs
(AD-A116819; ETL-R037) Avail: NTIS HC A02/MF A01 CSCL 08/5

This paper presents a symbiosis of pertinent in-house research involving inertial technology, mathematics, and physical geodesy, conducted in support of the Defense Mapping Agency, the U.S. Air Force, and the U.S. Army under consideration of potential utilization of generated data. Following an introduction, it first discusses the determination of gravity anomalies and the more detailed derivation of single horizontal channel deflection errors in semi-flat terrain and provides present and improved future accuracy estimates. Secondly, it presents a Wiener-type optimal solution for deflections of the vertical under application of the collocation method in physical geodesy with prior second order gyro bias removal. Thirdly, it outlines an advanced deflection estimation method under consideration of horizontal channel and gyro interactions and its modification in the case of strongly mountainous terrain. Fourthly, it summarizes the development of a partially associated optimal interpolation method for gravity anomalies and deflections of the vertical in mountainous terrain. Fifthly, it addresses potential civil and military applications including the construction of gravity anomaly and deflection networks from data obtained by multiple surveys, consideration of gravity vector data in geodetic network optimization, upward continuation of gravity anomalies and deflections of the vertical, and a gravity-programmed inertial positioning system. Sixthly, it comments on the need of a gradiometer-aided inertial system for rapid, high accuracy deflection determination, subterraneous mass detection, and the differential transformations between Cartesian and naturai or astronomic coordinates. GRA

N83-10686# Lincoln Lab., Mass. Inst. of Tech., Lexington.
SEISMIC DISCRIMINATION Semiannual Technical Summary Report, 1 Apr. - 30 Sep. 1981
Michael A. Chinnery 12 Apr. 1982 112 p
(Contract F19628-80-C-0002; ARPA Order 512; AF Proj. 1A10)
(AD-A116884; ESD-TR-81-339) Avail: NTIS HC A06/MF A01 CSCL 08/11

This Semiannual Technical Summary describes the Lincoln Laboratory Vela Uniform program for the period 1 April to 30 September 1981. During this period, the first working prototype of a Seismic Data Center has been completed. In this report, Sec. I describes this prototype system, Sec. II describes a series of activities in seismic processing related to the Center, and Sec. III describes a series of investigations in General Seismological Research. Author (GRA)

N83-10687# University of Southern California, Los Angeles. Geophysics Lab.
CRUSTAL AND UPPER MANTLE VELOCITY AND Q OF MAINLAND CHINA Final Technical Report, 2 Jul. 1976 - 30 Apr. 1982
Ta-liang Teng May 1982 31 p refs
(Contract F49620-76-C-0010; ARPA Order 3291; AF Proj. 3291)
(AD-A117030; AFOSR-82-0550TR; TR-82-8) Avail: NTIS HC A03/MF A01 CSCL 08/11

The temporal resolution and accuracy of FTAN (frequency-time analysis) as applied to surface wave dispersion analysis are examined for a period range from 10 to 200 seconds. The constant relative bandwidth filter, optimum bandwidth filter and display equalized filter are carefully examined with respect to their adequacy of application filter gives a better performance for relatively short-period (less than 50 seconds) dispersion measurement. To measure surface wave dispersion for a broad period range, a 'matched-filter FTAN' technique is introduced by modifying the 'residual dispersion measurement' technique. A detailed numerical analysis is made on this new technique, the result demonstrates a significant improvement on both the resolution and the accuracy of surface wave dispersion data extraction over a broad period range up to at least 200 seconds. GRA

N83-10688# Washington Univ., Seattle. Dept. of Oceanography.
CRUSTAL STRUCTURE NEAR THE ICELAND RESEARCH DRILLING PROJECT BOREHOLE FROM A SEISMIC REFRACTION SURVEY
William H. Thomson, Jan D. Garmany, and Brian T. R. Lewis 1980 26 p refs Submitted for publication
(Contract N00014-78-C-0389)
(AD-A115205; UW-Contrib-0000) Avail: NTIS HC A03/MF A01 CSCL 08/11

A seismic refraction survey was conducted at Reydarfjordur, Iceland as part of the Iceland Research Drilling Project in July, 1978. An array of 15 seismometers was used to measure apparent velocities from 25 explosions along a 23 km refraction line. The experiment yielded data used to determine the P and S-wave velocity structures beneath the drill site and to obtain bounds on the depth to seismic 'layer 3'. The observed apparent velocities

vary continuously as a function of range with a marked increased in velocity at a range of 16 km. This corresponds to an observed cross-over in the travel time data. The measurement of apparent velocities has yielded data of the form X(p), the distance to a measured ray parameter, and alpha(p), the delay time. Joint inversion of the X(p) and alpha)p) data has been performed by linear programming. Layers of constant slowness gradient are used as the basis for the inversion process. Estimates of error in the data are used to produce extremal bounds on the family of Earth models that satisfy the data. The resulting envelope of P-wave velocity models indicates a continuous variation of velocity with depth. Two regions of high velocity gradient are observed, one near the surface and the other at depths between 2.6 and 3.9 km associated with 'layer 3' in Iceland. These results suggest that modeling of Iceland's upper crust with a few thick homogeneous constant velocity layers is an inadequate representation of the velocity structure. GRA

N83-10689# Naval Research Lab., Washington, D. C. Space Sensing Applications Branch.

LOAD NUMBERS, SOLID EARTH TIDES, AND LIQUID CORE DYNAMICS Final Report

Paolo Lanzano 20 Jul. 1982 20 p refs

(PR0330341)

(AD-A117809; NRL-8624) Avail: NTIS HC A02/MF A01 CSCL 08/5

This report presents in a systematic and rigorous way procedures suitable for the numerical evaluation of the Earth's spheroidal deformations, which most commonly are called the Earth's tides. For this purpose, we: (a) study the Boussinesq theory for the elastic deformations of a flat plate and show how by applying the Boussinesq solution to the tangent plane at a loading point of the spheroidal Earth we can establish the asymptotic behavior of the load numbers (2); (b) elaborate on certain numerical procedures which seem to be best suited for the summation of series once the asymptotic behavior of their coefficients has been ascertained; (c) provide in tabular form the closed form expressions of those infinite series of spherical harmonics which are essential for the numerical evaluation of the Earth's tides; and (d) examine the dynamics of a liquid core for a nonrotating Earth to mathematically prove the existence of a boundary layer at the top of the liquid core. This layer provides a justification for the discontinuous behavior of some of the integration variables at the liquid core/solid mantle interface, and furnishes the proper number of free parameters for satisfying the boundary conditions at the loaded surface. Author (GRA)

N83-10690# Geological Survey, Denver, Colo.

VOLCANO-TECTONIC HISTORY OF CRATER FLAT, SOUTHWESTERN NEVADA, AS SUGGESTED BY NEW EVIDENCE FROM DRILL HOLE USW-VH-1 AND VICINITY

W. J. Carr 1982 27 p refs

(DE82-016957; USGS-OFR-82-457) Avail: NTIS HC A03/MF A01

Evidence for a possible resurgent dome in the caldera related to eruption of the Bullfrog Member of the Crater Flat Tuff was provided by the drilling of a 762 meter (2501 foot) hole in central Crater Flat. Although no volcanic units were penetrated by the drill hole (USW-VH-1), the positive aeromagnetic anomaly in the vicinity of the drill hole appears to result in part from the unusually thick, densely welded tuff of the Bullfrog. Major units penetrated include alluvium, basalt of Crater Flat, Tiva Canyon and Topopah Spring Members of the Paintbrush Tuff, and Prow Pass and Bullfrog Members of the Crater Flat Tuff. In addition, the drill hole provided the first subsurface hydrologic information for the area. The water table in the hole is at about 180 meters (600 feet), and the temperature gradient appears slightly higher than normal for the region. DOE

N83-10691# California Univ., Livermore. Lawrence Livermore Lab.

CROSS-BOREHOLE FRACTURE MAPPING USING ELECTROMAGNETIC GEOTOMOGRAPHY

A. L. Ramirez, F. J. Deadrick, and R. J. Lytle 12 May 1982 65 p refs

(Contract W-7405-eng-48)

(DE82-015648; UCRL-53255) Avail: NTIS HC A04/MF A01

Salt water was forced into a fractured rock mass, attenuating the high frequency electromagnetic waves used for probing. The locations in the rock where the salt water induced signal losses were then mapped by geotomography. This technique was used near Oracle, Arizona, in a granitic rock mass. The data obtained were reduced to gray level images, which show the calculated signal transmission properties of the rock mass. These images were analyzed and compared with borehole geophysical data: neutron logs, acoustic velocity logs, caliper logs, and acoustic televiewer logs. Comparisons between the images and the borehole geophysical data suggest that geotomography has merit when used to map fracture in granite. DOE

N83-10692# URS/Blume (John A.) and Associates, San Francisco, Calif.

GEOLOGY OF THE LAS VEGAS AREA

Lawrence L. Tabor Feb. 1982 86 p refs

(Contract DE-AC08-81NV-10145)

(DE82-015871; JAB-10145-1) Avail: NTIS HC A05/MF A01

The stratigraphy and structure of the basin fill and older rocks of the central part of Las Vegas Valley, particularly that part in which the city of Las Vegas and its outlying districts are located are considered. The interpretation of the lithology and structure of the near-structure Pliocene and Quaternary rocks in the central part of Las Vegas Valley, particularly in the vicinity of the city of Las Vegas, was based on field work and the study of many well logs. Author

N83-10693# California Univ., Livermore. Lawrence Livermore Lab.

AERIAL GEOLOGIC LOG FROM LIVERMORE, CALIFORNIA TO THE NEVADA TEST SITE, NYE COUNTY, NEVADA

J. L. Wagoner Jan. 1982 121 p refs

(Contract W-7405-eng-48)

(DE82-018392; UCRL-53217) Avail: NTIS HC A06/MF A01

Some geologic and cultural points of interest along Lawrence Livermore National Laboratory's F-27 flight between Livermore, California, and the Nevada Test Site, Navada are outlined. A geologic history is given for each of the four geologic provinces. Approximately 60 air photos are included which will help the traveler identify specific geologic features. Geologic cross sections of the area from Livermore Valley to Gold Mountain describe the geologic structure across the geologic provinces. A LANDSAT mosaic of the flight path is also included. DOE

N83-10694# Los Alamos Scientific Lab., N. Mex.

GEOLOGIC EVOLUTION OF THE JEMEZ MOUNTAINS AND THEIR POTENTIAL FOR FUTURE VOLCANIC ACTIVITY

Barry W. Burton Jan. 1982 35 p refs

(Contract W-7405-eng-36)

(DE82-008975; LA-8795-GEOL) Avail: NTIS HC A03/MF A01

Geophysical and geochemical data and the geologic history of the Rio Grande rift and the vicinity of the Jemez Mountains are summarized to determine the probability of future volcanic activity in the Los Alamos, New Mexico area. The apparent cyclic nature of volcanism in the Jemez Mountains may be related to intermittent thermal inputs into the volcanic system beneath the region. The Jemez lineament, an alignment of late Cenozoic volcanic centers that crosses the rift near Los Alamos, has played an important role in the volcanic evolution of the Jemez Mountains. Geophysical data suggest that there is no active shallow magma body beneath the Valles caldera, though magma probably exists at about 15 km beneath this portion of the rift. Lava or ash flows overriding Laboratory radioactive waste disposal sites would have little potential to release radionuclides to the environment. The probability of a new volcano intruding close enough to a radioactive waste disposal site to effect radionuclide release is $2 \times 10(+7)/y$. DOE

N83-10695# Texas A&M Univ., College Station. Dept. of Geophysics.
SUBSURFACE RADAR APPLICATIONS IN THE DELAWARE BASIN Final Report, 1 Jun. 1980 - 31 Jan. 1981
Robert R. Unterberger Oct. 1981 57 p refs
(Contract DE-AC04-76DP-00789; RF Proj. 4293)
(DE82-007147; SAND-81-7153; RFQ-49-5808) Avail: NTIS HC A04/MF A01

A method of probing into potash to determine if dangers lie ahead is discussed. The problem was to outline a breccia pipe was found protruded into the potash bed in Carlsbad, New Mexico. If, however, the discontinuity in the ore (breccia pipe) had any fractures linking with a high pressure water zone above the mining level, the act of mining into the pipe could have lost the mine to incoming water. Unsuccessful attempts to probe through the potash ore and see the breccia pipe are discussed. Data on laboratory measurements of the complex electric permittivity (dielectric constant and loss tangent) of potash samples are presented. DOE

N83-10696# Sandia Labs., Albuquerque, N. Mex. Instrumentation Applications Div.
SEAFLOOR EARTHQUAKE MEASUREMENT SYSTEM. VOLUME 1. OVERVIEW AND PHYSICAL DESCRIPTION
David E. Ryerson Dec. 1981 62 p refs
(Contract DE-AC04-76DP-00789)
(DE82-010382; SAND-81-1810/1) Avail: NTIS HC A04/MF A01

The seafloor earthquake measurement system (SEMS), a unique instrumentation system for collecting seismic motion data from remote ocean floor sites is discussed. The SEMS concept, the equipment which was developed and its deployment on site, as well as some field test results are described. DOE

N83-10697# California Univ., Livermore. Lawrence Livermore Lab.
GEOLOGY OF THE SOUTHEASTERN LIVERMORE VALLEY, ALAMEDA COUNTY, CALIFORNIA
J. J. Sweeney and J. E. Springer Oct. 1981 63 p refs
(Contract W-7405-eng-48)
(DE82-012496; UCRL-53200-Rev-1) Avail: NTIS HC A04/MF A01

This report is the result of detailed geologic mapping of an area southeast of Livermore Valley, Alameda County, California, T3S, R3E. Rock units exposed in the area are the Franciscan Assemblage, Great Valley Sequence, and marine and nonmarine sediments of Tertiary to Quaternary age that have been extensively folded and faulted. The Greenville Fault is the youngest tectonic feature in the area, truncating all other structures. Our interpretation of the Carnegie and Corral Hollow Faults agrees with recent mapping by T. W. Dibblee and significantly disagrees with an earlier mapping by D. Herd and A. Huey. Our observations are compared in detail with those reported by previous investigators, and also present results of a petrologic study of the Cretaceous and Tertiary sediments found in the area. DOE

N83-10698# Los Alamos Scientific Lab., N. Mex.
EARTHQUAKE CATALOG FOR NORTHERN NEW MEXICO Progress Report
D. J. Cash, K. H. Olsen, N. J. McFarland, and J. J. Wolff Apr. 1982 15 p refs
(Contract W-7405-eng-36)
(DE82-015900; LA-9307-PR) Avail: NTIS HC A02/MF A01

The earthquakes located in northern New Mexico by the Los Alamos National Laboratory seismic array are summarized. Data are presented in the form of tables and epicenter maps, with a brief explanatory text. DOE

N83-10699# California Univ., Livermore. Lawrence Livermore Lab.
ASSESSMENT OF ACTIVE FAULTS FOR MAXIMUM CREDIBLE EARTHQUAKES OF THE SOUTHERN CALIFORNIA-NORTHERN BAJA REGION
D. B. Slemmons, P. OMalley, R. A. Whitney, D. H. Chung, and D. L. Bernreuter 3 Jun. 1982 85 p refs Prepared in cooperation with Nevada Univ.
(Contract W-7405-eng-48)
(DE82-016327; UCID-19125) Avail: NTIS HC A05/MF A01

Compilation of a data base is presented for maximum or maximum credible earthquakes that can be used to compute seismic hazard spectra at the San Onofre Nuclear Generating Stations in southern California. Estimates of fault slip rate and estimated recurrence - northern Baja California region are given. According to a direct relationship between the total fault length and the earthquake magnitude, the maximum earthquake for the Offshore Zone of Deformation (OZD) is estimated to be of about 6.8 or 6.9 surface wave magnitude. Another empirical relationship relating the fractional fault length and earthquake magnitude for strike slip faults results in an estimated maximum earthquake of about M/sub S/ = 6.8 for the OZD. DOE

N83-10700# California Univ., Livermore. Lawrence Livermore Lab.
EARTHQUAKE STRONG-MOTION INSTRUMENTATION AT LAWRENCE LIVERMORE NATIONAL LABORATORY
A. F. Shakal and R. C. Murray Oct. 1981 26 p refs
(Contract W-7405-eng-48)
(DE82-012493; UCRL-53246) Avail: NTIS HC A03/MF A01

A network of strong-motion accelerograph was installed at the Lawrence Livermore National Laboratory (LLNL) as part of site seismic safety program. The network has two objectives: to provide quantitative information on the severity of ground shaking for the assessment of structural effects at LLNL following an earthquake, and to provide data for analyses of the free-field ground motion and the causative earthquake. The network includes digital multichannel central-recording systems in Building 111 (9-channel) and in Building 332 (18-channel). Independent analog accelerographs are included to provide redundancy. A multichannel system was also installed on the spaceframe at the Laser facility. In addition to the structural instrumentation, six free-field stations are located at and near the Laboratory. The strong-motion network will provide rapid indication of peak ground-motion values as well as data for detailed post-earthquake studies of ground motion and structural response. DOE

N83-10701# Geological Survey, Denver, Colo.
MAGNETOMETRIC RESISTIVITY SURVEY NEAR FORTYMILE WASH, NEVADA TEST SITE, NEVADA
David V. Fitterman 1982 30 p refs
(Contract DE-AI08-78ET-44802)
(DE82-016956; USGS-OFR-82-401) Avail: NTIS HC A03/MF A01

The results of a magnetometric resistivity (MMR) survey near Forty Mile Wash, Nevada Test Site, Nevada are given. The work was performed to determine if the method is useful in locating faults. The field location is near some mapped faults in the vicinity of the Yucca Mountain waste disposal study area. The field test of the MMR method over a concealed fault was able to detect a conductivity boundary associated with the fault. Interpretation of the resistivity ratio is in general agreement with the value obtained from a dipole-dipole resistivity survey. While the presence of a conductive zone could be detected, the western boundary of the feature cannot be located with the limited data available. Operationally the technique is somewhat slow. This situation was exacerbated by the long transmitter wire used. A more practical scheme would be to use a shorter U shaped transmitter wire about 400 m on a side. A still better method might be to use a long straight wire and to make measurements off one end of the wire. This geometry would reduce the anomalous magnetic fields produced by variations of the transmitter wire from its assumed straight line between surveyed points. DOE

N83-10702# Foundation Sciences, Inc., Portland, Oreg.
LABORATORY ROCK MECHANICS TESTING MANUAL
Frank S. Shuri, John D. Cooper, and Molly L. Hamill Oct. 1981 309 p ref Prepared for Battelle Memorial Inst., Columbus, Ohio
(Contract DE-AC06-76RL-01830)
(DE82-015763; ONWI-311) Avail: NTIS HC A14/MF A01

Standardized laboratory rock mechanics testing procedures which were prepared for use in the national terminal waste storage program are presented. The procedures emphasize equipment performance specifications, documentation and reporting, and quality assurance acceptance criteria. Sufficient theoretical background is included to allow the user to perform the necessary data reduction. The procedures incorporate existing standards when possible, otherwise they represent the current state of the art. DOE

N83-10703# Wisconsin Univ., Madison. Dept. of Metallurgical and Mineral Engineering.

ANALYSIS OF DISPLACEMENT AND STRAIN DATA FOR THE DETERMINATION OF THE IN-SITU DEFORMABILITY OF ROCK MASSES

Rudolfo V. delaCruz, Mario Karfakis, and Kunsoo Kim 30 Sep. 1981 15 p refs Prepared in cooperation with Rockwell International Corp., Richland, Wash.

(Contract DE-AC06-77RL-01030)

(DE82-012540; RHO-BW-SA-197-P) Avail: NTIS HC A02/MF A01

The in situ deformability of a highly jointed basalt rock mass was determined by the NX borehole jack method where the displacements of opposing curved platens were related to the applied hydraulic pressures, as well as by the modified Goodman jack method where the tangential strains on the borehole walls were related to the indiced tangential stresses. The modulus obtained by the modified Goodman jack method were much higher than those obtained by the NX borehole jack method. To explain the discrepancy, the influence of fractures and test variables such as depth, orientation, hole number and applied pressure on the calculated modulus of the rock mass were analyzed by factorial analysis and it was found that the orientations and depths of measurement has statistically significant effects. The in situ deformability values obtained by nonlinear regression analysis were also found comparable with other measurements and empirically predicted values for the basalt rock mass. DOE

N83-10704# Sattleger Ingenieurbuero fuer Angewandte Geophysik, Meppen (West Germany).

INVERSE MODELING SYSTEM FOR ANALYSIS OF SEISMIC INTERFACES: INMOD Final Report, Oct. 1981

Johann Sattlegger Bonn Bundesministerium fuer Forschung und Technologie May 1982 165 p refs Sponsored by Bundesministerium fuer Forschung und Technologie Prepared in cooperation with Preussag AG, Erdoel und Erdgas, Hannover

(BMFT-FB-T-82-063; ISSN-0340-7608) Avail: NTIS HC A08/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 33

A signal analysis system (INMOD) which after standard processing and preliminary interpretation of a seismogram gives complementary information, e.g., values of amplitude, frequency distribution, and wave velocity, is presented. The algorithm used is based on Fourier series. The entire mathematical analysis is described and the inverse modeling system, leading to the representation of different geological interfaces with corresponding velocities, is considered. The described method was applied to two drillings, one in the North Sea and one in the north of Germany (RFA). Calculated results and practical findings are compared. It is proved that the method may be tested extensively and can be used for production use. Author (ESA)

N83-10705# Technische Universitaet, Clausthal-Zellerfeld (West Germany). Inst. fuer Tiefbohrkunde und Erdoelgewinnund.

DEVELOPMENT OF NEW AND IMPROVEMENT OF EXISTING CORE RECOVERY METHODS Final Report, Mar. 1981

Claus Marx and Ernst-Joachim Kroemer Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 207 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie

(BMFT-FB-T-82-091; ISSN-0340-7608) Avail: NTIS HC A10/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 36,50

Prospecting of new oil and gas fields through sampling of soil by core drilling was investigated. Two core recovery methods were designed; corresponding prototypes were built and tested. The drill mandrel, the core barrel closing system, solliciation of the barrel by hydraulic friction, and sollicitation of the driving axe during side drilling were studied. The core barrel system with built in hydrostatic drill motor and diamond bit drill was retained. This combination leads to a core sample recovery rate of over 90% and a drill speed increase of 40% over the rotary core sampling system. The KIBM-1 prototype was tested in five drilling applications in deep wells. The sidewall coring system permits recovery of core material from the bore hole wall for boreholes at least eight and a half inches in diameter. Author (ESA)

N83-10706# National Oceanic and Atmospheric Administration, Rockville, Md. Federal Coordinator for Meteorological Services and Supporting Research.

THE NATIONAL PLAN FOR STRATOSPHERIC OZONE MONITORING AND EARLY DETECTION OF CHANGE, 1981 - 1986

Feb. 1982 79 p refs

(PB82-203159; NOAA-82040801; FCM-P17-1982) Avail: NTIS HC A05/MF A01 CSCL 04A

A transition from reliance on a ground-based, geographically-biased ozone observing network operated by cooperating nations to a combined satellite and ground-based monitoring program that will provide global coverage of the vertical distribution of stratospheric ozone, as well as total ozone overburden is discussed. The strategy, instrumentation, and monitoring products to be prepared during this transition period are also discussed. Global atmospheric monitoring for protection of the ultraviolet shielding properties of atmospheric ozone is considered. The operational satellite ozone vertical profile monitoring system to be flown on the NOAA Tiros N operational satellite series to carry on ozone measurements initiated on the NASA R&D satellites is also considered. Author

N83-10707# National Oceanic and Atmospheric Administration, Rockville, Md. Engineering Development Office.

EFFECTS OF DETECTION ALGORITHM ON ACCURACY DEGRADATION FROM LOGARITHMIC AND DIFFERENCE PROCESSING FOR AIRBORNE LASER BATHYMETRY RETURNS

Gary C. Guenther Feb. 1982 45 p refs

(PB82-215138; NOAA-82041501; NOAA-TR-OTES-6) Avail: NTIS HC A03/MF A01 CSCL 14B

The Hydrographic Airborne Laser Sounder (HALS) system currently under construction for the Naval Ocean Research and Development Activity (NORDA) incorporates logarithmic amplification for dynamic range compression and a first difference processing circuit to reduce the volume scattering signal prior to the arrival of the bottom return. These non-linear signal processing steps distort the input waveforms and lead to depth measurement biases whose magnitudes depend on signal strengths, pulse location algorithms, and algorithm parameters. The behavior of the estimated biases for varying circuit parameters is shown to be sensitive to the assumed pulse shape. An appropriate gamma function representation is selected and discussed. Biases as a function of signal strengths are reported for two separate pulse location algorithms: linear fractional thresholds and a 'constant fraction discriminator' circuit as used in HALS. If return signal strengths are recorded by the operational system software, these bias predictors can be applied to field data as estimated bias correctors. Author

N83-10708# Georgia Inst. of Tech., Atlanta. School of Civil Engineering.

PROBABILISTIC EVALUATION OF DAMAGE POTENTIAL IN EARTHQUAKE-INDUCED LIQUEFACTION IN A 3-D SOIL DEPOSIT

A. Halder and F. J. Miller Mar. 1982 146 p refs

(Grant NSF PFR-80-06348)

(PB82-202276; NSF/CEE-82003; SCEGIT-101-82) Avail: NTIS HC A07/MF A01 CSCL 08K

A probabilistic model to evaluate the risk of liquefaction at a

site and to limit or eliminate damage during earthquake induced liquefaction is proposed. The model is extended to consider three dimensional nonhomogeneous soil properties. The parameters relevant to the liquefaction phenomenon are identified, including: (1) soil parameters; (2) parameters required to consider laboratory test and sampling effects; and (3) loading parameters. The fundamentals of risk based design conceps pertient to liquefaction are reviewed. A detailed statistical evaluation of the soil parameters in the proposed liquefaction model is provided and the uncertainty associated with the estimation of in situ relative density is evaluated for both direct and indirect methods. It is found that the liquefaction potential the uncertainties in the load parameters could be higher than those in the resistance parameters. E.A.K.

N83-10709# Geological Survey, Denver, Colo. Geologic Div.
DESCRIPTION OF MAGNETIC TAPE CONTAINING TRACE ELEMENT DATA FOR BEDROCK GEOCHEMICAL SAMPLES FROM THE WESTERN CHICAGOOF-YAKOBI ISLANDS WILDERNESS STUDY AREA, SOUTHEASTERN ALASKA
Bruce R. Johnson 1982 16 p refs
(PB82-191834; DOI/DF-82/002A) Avail: NTIS HC A02/MF A01 CSCL 08I

Emission spectroscopy analyses for 28 elements and by atomic absorption techniques as well as geodetic coordinate in decimal degrees are included. Sampling procedures are described.
Author (GRA)

N83-10710# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.
FAULT ZONES AND SEISMICITY IN WESTERN CONNECTICUT AND SOUTHEASTERN NEW YORK
J. Edward Tillman (Gruy, H. J., Companies) Oct. 1981 87 p refs
(Contracts N00024-81-C-5301; NRC-04-76-291)
(PB82-215641; JHU/APL/QM-81-126) Avail: NTIS HC A05/MF A01 CSCL 08G

Two previously unmapped, major fault zones were identified and investigated in southeastern New York and western Connecticut. These fault zones were clearly active in the Paleozoic and Mesozoic and probably also in the Cenozoic. Although surface rupture has not been associated with historic events along these zones, their locations do coincide with alignments of historic and instrumentally measured seismicity. Multiple episodes of epigenetic mineralization that occur on these faults indicate that their faulting and circulation histories are indeed complex and that a detailed record of their stress release history from the Paleozoic to the present can be obtained for each fault zone. Author (GRA)

N83-10711# National Oceanic and Atmospheric Administration, Silver Spring, Md. Air Resources Lab.
STRATOSPHERIC LIDAR INVESTIGATION OF THE MT. ST. HELENS VOLCANIC CLOUD OVER BOULDER, COLORADO
John C. Osborn, Jr., John J. Deluisi, and Ronald W. Fegley Feb. 1982 51 p refs
(PB82-215070; NOAA-82042303; NOAA-TM-ERL-ARL-110) Avail: NTIS HC A04/MF A01 CSCL 08G

Layered volcanic aerosol enhancement was observed. A lidar system with dyelaser was the primary raw data acquisition source. Supplemental lidar return data from another source, were also used. Final data, presented as backscatter ratio versus altitude plots, were determined using the molecular normalization reduction method. Rawinsonde data were used to obtain the real molecular (Rayleigh) backscattering profiles needed for more accurate reduction. Potential error sources involved in collecting and final processing are discussed. Points of interest and discussion include layering, vertical migration and temporal variability, layer classifications and characteristics changes, peak ratio intercomparisons, cloud trajectory and global transit time, eruption plume/satellite photograph intercomparison, and a simple determination of the ratio range of background stratospheric aerosol backscatter for comparison with the volcanically enhanced backscatter ratio data over Boulder. Author (GRA)

N83-10712# Purdue Univ., Lafayette, Ind. Water Resources Research Center.
USE OF SPECTRAL DATA TO ESTIMATE THE RELATIONSHIP BETWEEN SOIL MOISTURE TENSIONS AND THEIR CORRESPONDING REFLECTANCE
J. B. Peterson and M. F. Baumgardner Dec. 1981 42 p refs (OWRT Proj. A-061-Ind)
(PB82-224528; W82-04963; TR-143) Avail: NTIS HC A03/MF A01 CSCL 08M

Fifty-seven soils covering a wide range were studied for the relationship between their loss in reflectance when wet versus their oven dry reflectance. Regression analysis revealed R2 values of .196 and .963 for the water absorption bands and of .845 for one of the visible bands, 0.52 to 0.58 microns. Twelve of the soils were brought to equilibrium with 1/3 and 1/10 bar moisture levels and compared with oven dry. This study revealed that soils of high cation exchange capacity generally exhibited very low reflectance when moist whereas a stair-stepped relationship existed for the sandier soils. To further appraise the effect of different moisture levels to reflectance, 11 soils were equilibrated at 10 and 15 bar moisture tension and the spectral data compared with those for oven dry, 1/3 and 1/10 bar. Reflectance data for oven dry, 15, 10, 1/3 and 1/10 on these samples revealed three general patterns of spectral response for these soils. The fine textured soils showed low reflectance for the wetter levels with little differentiation; the sandy soils showed much higher, brighter responses for the drier samples than for the wetter moisture levels. A more oven gradient of reflectance existed for the silt loams.
Author (GRA)

N83-10713# Joint Publications Research Service, Arlington, Va.
***USSR REPORT*: EARTH SCIENCES, NO. 23**
12 Oct. 1982 129 p refs Transl. into ENGLISH from various Russian articles
(JPRS-81965) Avail: NTIS HC A07/MF A01

Meteorological, oceanographic, geophysical, and atmospheric research is reported. For individual title, see N83-10714.

N83-10714# Joint Publications Research Service, Arlington, Va.
KOLA SUPERDEEP HOLE Progress Report
Boris Konovalov *In its* USSR Rept.: Earth Sci., No. 23 (JPRS-81965) 12 Aug. 1982 p 49-51 Transl. into ENGISH from Nauka i Tek. (Riga), no. 6, Jun. 1982 p 5-6 (For primary document see N83-10713 01-46)
Avail: NTIS HC A07/MF A01

The Kola drilling project is described. N.W.

47 METEOROLOGY AND CLIMATOLOGY

Includes weather forecasting and modification.

N83-10715# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
A STUDY OF THE STRUCTURE OF THE WIND OVER TROPICAL SAVANNA M.S. Thesis [UM ESTUDO SOBRE A ESTRUTURA DO VENTO ACIMA DA SAVANA TROPICAL]
Leonardo Deane de Abreu Sa May 1982 103 p refs In PORTUGUESE; ENGLISH summary
(INPE-2412-TDL/092) Avail: NTIS HC A06/MF A01

Experimental data for the Monin-Obukhov functions, phi sub m and phi sub h, obtained over an aerodynamically very rough surface (trees and shrubs with mean height of 8 meters), present high discrepancy compared to values over smooth surfaces. An apparent sensible heat flux divergence (convergenc) is present when the plant canopy is fully sunlit, disturbing the diurnal potential temperature profiles. When the thermal convection ceases, the air above the canopy becomes stably stratified; this, in turn, may produce interactions of the turbulence field with Brunt-Vaisala type of oscillations, which could be responsible for the inflection points observed in the wind profiles. Author

N83-10716# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
VARIABILITY OF WATER VAPOR FLUX IN THE NORTHEAST BRAZIL REGION
Valdo da S. Marques, Vadlamudi Brahmananda Rao, and Luiz Carlos B. Molion Jul. 1982 22 p refs In PORTUGUESE; ENGLISH summary Submitted for publication
(INPE-2461-PRE/153) Avail: NTIS HC A02/MF A01

Interannual variations in the water vapor flux for dry and wet years are presented. Water vapor fluxes are estimated for a cylinder whose base covers most of the northeast Brazil extending in the vertical up to 300 mb. Results show that the interannual variations are caused essentially by the dynamics of motion systems which are represented by the convergence and divergence of water vapor flux in the lower troposphere. The principal exchanges of water vapor show the importance of interhemispherical exchanges and also the interactions with mid-latitudes. Author

N83-10717# Naval Postgraduate School, Monterey, Calif. Dept. of Meteorology.
TYPHOON MOTION FORECASTING EMPIRICAL ORTHOGONAL FUNCTION ANALYSIS OF THE SYNOPTIC FORCING M.S. Thesis
Alan R. Shaffer Mar. 1982 151 p refs
(AD-A117539) Avail: NTIS HC A08/MF A01 CSCL 04/2

Empirical Orthogonal Function (EOF) analysis is used to describe the synoptic forcing features of selected northwestern Pacific Ocean tropical cyclones from 1967 to 1976. EOF analysis is applied to the geopotential field at 850, 700 and 500mb on a 120 point grid with 5 degree latitude and longitude spacing that is centered on the storm. The 120 EOF coefficients (for each level) are computed for a sample of 454 cases in the history file. The coefficient vectors are truncated to the first 10 coefficients, based on the Monte Carlo selection criteria of Preisendorfer and Barnett. These coefficients describe about 85% of the variance in the fields. The synoptic forcing represented by the EOF coefficients is then used as a predictor in a regression analysis track forecast scheme, along with past storm movement and intensity during the past 36 hours. The EOF-based regression equations are verified over an independent sample of 50 storms, and the position errors compared to the official Joint Typhoon Warning Center (JTWC) forecast errors. The EOF-based regression equations give, on the average, a 17% reduction in error when compared to the official forecast issued by JTWC. Over the independent sample, the 500mb equations performed better than the equations of the other two levels. GRA

N83-10718# Technische Hochschule, Darmstadt (West Germany). Inst. fuer Meteorologie.
DETERMINATION OF CLIMATOLOGICAL PARAMETERS OF GLOBAL RADIATION AND DIRECT SOLAR RADIATION FOR HORIZONTAL, NOT HORIZONTAL, FIXED AND NORMAL INCIDENT RADIATION ABSORBER Final Report, Jan. 1980
Gerhard Manier and Hartmut Fuchs Bonn Bundesministerium fuer Forschung und Technologie May 1982 36 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-070; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 7,50

Solar radiation data were gathered. The data acquisition system consisted of five horizontal receivers, four inclined receivers, two tracking receivers, and one solar radiation indicator. Meteorological parameters were cloud cover, altitude of lower cloud cover, type of weather conditions. Half hourly sums of global, diffuse and direct solar radiation as well as the time percentage of direct solar radiation, the number, mean duration, and scatter of sunshine periods as calculated by computer. The investigations on the relationship between direct and diffuse solar radiation and synoptic weather observations were extrapolated on measurements taken over 8 years. The differences between measured and calculated monthly radiation sums are always smaller than 0.5 kWh/sq m. Author (ESA)

N83-10719# Friedrichs (Theodor) und Co., Schenefeld (West Germany). Meteoroligische Geraete und Systeme.
SIMPLE ANEMOMETER FOR WIND CLASSIFICATION Final Report, Feb. 1981
Hans-Joachim Friedrichs, Boy Lorenzen, and Albert Haug (Fachhochschule, Aachen) Bonn Bundesministerium fuer Forschung und Technologie Jul. 1982 29 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-106; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 6

Development of a simple wind velocity data acquisition system independant of an external power supply and operating for long durations without supervision was considered. The data are essential for possible location of windmills. Automatic classification of data in wind velocity categories was also considered. Equipment consisted of an anemometer with a Reed contact as impulse emitter, an indicator for 4 or 6 wind velocity categories, and four 1,5 V electric batteries, assuring a four month supply. Wind integration time was 6 or 10 minutes. Tests in laboratory, in environmental test chamber, in wind tunnel, and outdoors gave satisfying results. Outdoor tests lasted three months, with temperatures ranging from minus 14 C to plus 17 C, winds from zero to gale force, relative humidity from 25 to 100%, and precipitations of rain, hailstones, and snow. Author (ESA)

N83-10720# Geological Survey, Albany, N.Y. Water Resources Div.
EVALUATION OF RAINFALL-RUNOFF DATA NETWORK, ROCKLAND COUNTY, NEW YORK Final Report, 1975 - 1979
Richard Lumia 1982 31 p refs Prepared in cooperation with Rockland County Drainage Agency
(PB82-204058; USGS/WRD/WRI/82-026; USGS/WRI-81-49) Avail: NTIS HC A03/MF A01 CSCL 13B

Data from 12 rainfall-runoff gaging stations on 10 streams were collected; data from 10 of the sites were judged acceptable for input to watershed models. The HEC-1 flood hydrograph package was used to develop a rainfall-runoff model for each site. Initial results of model analysis indicated a bias for peak discharges during the growing season; adjustment of input parameters to reflect antecedent soil moisture conditions gave more accurate results. The average difference between observed and simulated peak-discharge magnitudes for all sites and events decreased from 41.7 percent to 25.0 percent after seasonal parameter adjustments. The results of the model analyses indicate that updated flood frequency estimates for each site may be sufficiently reliable to aid in managing flood plains and drainage systems, and in designing drainage structures. M.G.

N83-10721# Illinois State Water Survey, Urbana.
RELATIONSHIPS BETWEEN RAINFALL AND METEOROLOGICAL SURFACE VARIABLES: APPLICTIONS TO MIDWESTERN OPERATIONAL WATHER MODIFICATION. REPORT ON OSET, VOLUME 1 Final Report
Gary L. Achtemeier Jun. 1981 73 p refs
(Grant NSF ENV-79-05007)
(PB82-202805; ISWS/CON-257/81) Avail: NTIS HC A04/MF A01 CSCL 04B

Meteorological variables done as part of the Operational Seeding Evaluation Techniques (OSET) project are summarized. The approaches used in studying the covariate problem, including the advantages and disadvantages of using spatial analyses and the data, the analysis techniques, and the covariates selected are described. Results for the rainfall-covariate relationship through correlation coefficient pattern analyses and stepwise regressions with no stratifications, and results for the rainfall-covariate relationships with stratifications and/or physical constraints are presented. The results answer important questions: (1) do the covariates derived from surface data have any worth for the evaluation of operational weather modification projects; (2) if so, which predictors are best; (3) where should the observations be taken to maximize the relationship with rainfall; (4) when should

the observations be taken to maximize the relationship with rainfall; (5) what is the observation frequency and spacing that will minimize the cost of data collection and yet be sufficient to maintain the maximum predictor variable - rainfall relationship; and (6) are the results transferable to other Middle Western states. GRA

N83-10722# National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
SURFACE METEOROLOGICAL FEATURES ASSOCIATED WITH EASTERN COLORADO SEVERE CONVECTIVE STORMS
D. M. Rodgers and R. A. Maddox Dec. 1980 30 p refs
(PB82-203134; NOAA-82040704; NOAA-TM-ERL-OWRM-13) Avail: NTIS HC A03/MF A01 CSCL 04B

To better understand the synoptic surface conditions present during severe thunderstorm episodes in eastern Colorado, 300 such days were examined. Four basic surface patterns associated with severe convective weather east of the Continental Divide are identified from this data set. A large majority of severe thunderstorms (i.e., those which produce large hail, and/or damaging wind, and/or tornadoes) are shown to occur in the region north of a stationary surface front in an area of large-scale anticyclonic upslope flow. A severe thunderstorm climatology is developed and a range of values of prestorm parameters (pressure, temperature, dewpoint, and wind) is graphically presented, using spatially interpolated surface observations taken from the surface chart preceding each of the 300 severe storm events. Finally, a surface-based severe storm index, applicable to eastern Colorado, is developed with examples of how it might be used as guidance in severe thunderstorm forecasting. M.G.

N83-10723# Illinois State Water Survey, Champaign.
HYDROMETEOROLOGY OF HEAVY RAINSTORMS IN SELECTED ILLINOIS BASINS
Floyd A. Huff 1981 98 p refs
(PB82-202292; ISWS/RI-96/81) Avail: NTIS HC A05/MF A01 CSCL 04B

This report is a working guide for hydrologists and engineers who are concerned with the frequency distribution of rainfall and the patterns and characteristics of severe precipitation events for six major basins in Illinois: the Kaskaskia, Big Muddy, Sangamon, Little Wabash, Embarras, and Spoon Rivers. Included are: the frequency distribution of areal mean rainfall for return periods of 1 to 100 years and storm periods of 6 to 48 hours; the frequency distribution of areal mean rainfall for fixed subareas of each basin for areas of 10 to 400 square miles and storm periods of 1 to 48 hours; and the frequency distribution of areal mean rainfall for incremental areas of 25 to 1000 square miles and durations of 6 to 48 hours for nonspecific areas of each basin (basin storm envelope values). Also described are certain storm characteristics that are mutually applicable to all six basins, such as storm orientation and shape and synoptic weather systems that produce the heavy storms. GRA

N83-10724# Indian Inst. of Tropical Meteorology, Poona.
A STUDY OF THE ANOMALOUS THERMAL AND WIND PATTERNS DURING EARLY SUMMER SEASON OF 1979 OVER THE AFRO-ASIAN REGION IN RELATION TO THE LARGE SCALE PERFORMANCE OF THE MONSOON OVER INDIA
R. K. Verma and D. R. Sikka Mar. 1981 19 p refs
(PB82-204611) Avail: NTIS HC A02/MF A01 CSCL 04B

Anomaous features in the upper tropospheric temperature (cold anomaly) and wind field (westerly anomaly) over the Asian region during the early summer months of May and June in the Monex year of 1979 were found to persist in July and August. Surface pressure over India during the monsoon season of 1979 were also observed to be above normal. Abnormality was also found in the tracks of the monsoon depressions of the season. All these these features are discussed in relation to the failure of the monsoon over large parts of India during the year. Author (GRA)

N83-10725# National Oceanic and Atmospheric Administration, Washington, D. C. Federal Coordinator for Meteorological Services and Supporting Research.
THE FEDERAL PLAN FOR METEOROLOGICAL SERVICES AND SUPPORTING RESEARCH, FISCAL YEAR 1983
Mar. 1982 130 p refs
(PB82-215708; NOAA-82041201; PCM-P1-1982) Avail: NTIS HC A07/MF A01 CSCL 04B

The measures being taken to protect weather-sensitive activities are emphasized. The various agency plans for improving these services are described. Numerical weather prediction is analyzed. Numerical weather prediction is at the core of the complex set of forecast services, and more accurate forecasts depend primarily on progress in numerical weather prediction. Interagency cooperation that is essential to meet the needs for meteorological services is highlighted. E.A.K.

N83-10726# National Weather Service, Silver Spring, Md. Techniques Development lab.
THE SEA LEVEL PREDICTION MODEL OF THE LOCAL AFOS MOS PROGRAM
David A. Unger Apr. 1982 40 p refs
(PB82-215492; NOAA-82041504; NOAA-TM-NWS-TDL-70) Avail: NTIS HC A03/MF A01 CSCL 04B

A sea level pressure (SLP) model was adapted for the Local AFOS MOS Program (LAMP). The SLP model, with the changes that were made from its original formulation, is documented. The model predicts 1000-mb heights with an equation based on the principle of conservation of potential vorticity. The 1000-mb heights are estimated from hourly observations of sea level pressure, which enables the SLP model to be run at any hour with input from surface observation and a 500-mb height forecast from NMC's LFM model. The model can be run on minicomputers similar to those used in AFOS, enabling guidance to be produced at local forecast offices. Observations from 0800 GMT are used to test the SLP model's ability to update the LFM forecast from 0000 GMT. Results are 30 ample winter cases and 15 summer cases indicate that the SLP model has more skill than the LFM for about 14 hours after 0800 GMT. Greater detail and more accurate placement due to the later initial data account for the more accurate predictions. Author (GRA)

N83-10727# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-1: THE OPERATIONAL DESIGN AND DERIVATION OF THE BASIC AND ANCILLARY DATA SETS
A. G. Barnston and W. L. Woodley Mar. 1982 97 p refs
(PB82-215104; NOAA-82042302; NOAA-TM-ERL-OWRM-14) Avail: NTIS HC A05/MF A01 CSCL 04B

The Florida Area Cumulus Experiment (FACE-1), an attemp to explore the application of single cloud rain enhancement to area wide rain enhancement, is examined. The program design and how well it was implement is discussed. The data reduction process and its relationale are described both for the basic rainfall data and for the predictor variables that were covariate data are presented for each of the 104 days of experimentation along with the treatment decisions (silver iodide vs. a placebo). GRA

N83-10728# Environmental Research and Technology, Inc., Concord, Mass.
TIROS-N SERIES DIRECT READOUT SERVICES USERS GUIDE
James C. Barnes and Michael D. Smallwood Washington NOAA Mar. 1982 125 p refs
(Contract NOAA-03-8-A01-78-4312)
(PB82-219023; NOAA-82041505) Avail: NTIS HC A06/MF A01 CSCL 04B

Examples of TIROS-N APT (Automatic Picture Transmission) and HRPT (High Resolution Picture Transmission) direct readout images are included to demonstrate the format of the direct readout data transmitted by the TIROS-N series satellites and to demonstrate the differences between the APT and the HRPT images. In some of the samples shown, the data were processed to enhance certain features in the images. Although sophisticated types of data enhancement require expensive processing equipment,

some enhancement of APT data can be performed using relatively inexpensive equipment available to APT users. Author (GRA)

N83-10729# Washington State Univ., Pullman. Air Pollution Research Section.
METEOROLOGY AND AIR QUALITY PATTERNS IN ST. LOUIS RAPS PROGRAM, UPPER LEVEL ANALYSES Final Report
Mark Vuono, Fletcher Shives, and Elmer Robinson May 1982 133 p refs
(Grant EPA-R-806176010)
(PB82-217522; EPA-600/3-82-056) Avail: NTIS HC A07/MF A01 CSCL 04B

A statistical map-typing procedure was used to stratify regional weather patterns over an 800-km radius area centered on St. Louis. It was intended for application to air pollution studies. Seasonal weather types were obtained fro 850-mb height patterns and for geostrophic wind patterns based on surface pressure gradients for the four-year period 1973 through 1976. A total of 21 separate weather map types were identified for the 850-mb level synoptic flow, and a total of 36 map types were identified for the geostrophic wind flow. To show the relationships between the synoptic weather types and air quality, statistical correlations were calculated between the daily map types and observed air quality data using O3, CO, total suspended particles, sulfate, and nitrate concentrations from the 1975-1976 St. Louis RAPS program. The results show that synoptic map types have a definite and useful correlation with significantly different levels of air pollutant concentrations. The results also indicate that the correlations between maps types and average air quality concentrations is better for the 850-mb weather pattern types than for the surface or geostrophic types. Author (GRA)

N83-10730# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Weather Research and Modification.
FACE-2 DATA REDUCTIONS (PRIOR TO DISCLOSURE OF THE TREATMENT DECISIONS). PART 5: SATELLITE-ESTIMATED RAINFALL FROM A GEOSTATIONARY PLATFORM IN FACE-2
Jose G. Meitin, Jr., William L. Woodley, and Cecilia G. Griffith Oct. 1981 147 p refs
(PB82-216581; NOAA-82042903; NOAA-TM-ERL-OWRM-11) Avail: NTIS HC A07/MF A01 CSCL 04B

Precipitation on the 51 FACE-2 B days was estimated for the Florida area cumulus experiment (FACE) target area and an extended surrounding area through use of the digital GOES infrared imagery. The satellite rain estimation technique is described. Daily rain volumes and daily isohyetal maps are given. The approach to determine the extra-area effects of seeding with these rainfall data is outlined. M.G.

N83-10731# Indian Inst. of Tropical Meteorology, Poona.
MODIFICATION OF PALMER DROUGHT INDEX
H. N. Bhalme and D. A. Mooley Mar. 1981 38 p refs
(PB82-181751) Avail: NTIS HC A03/MF A01 CSCL 04B

From an examination of the drought conditions in two selected districts each from arid, semi-arid and dry sub-humid climatic regions of tropical India on the basis of Palmer drought index it was found that Palmer index fails to describe realistically the drought conditions in these climatic regions. The Palmer index was modified to suit the tropical weather conditions in India. The modifications introduced are in respect of the weighting factor and drought severity equation. The modified drought index is observed to produce better and realistic results. Power spectrum analysis of the series of the mean modified drought index for the period June-December from 1901-1970, reveals a significant period near 10 years, corresponding to sunspot cycle, over semi-arid and arid regions of northwest India. Severe drought conditions over these areas appear to have a general tendency to occur in the next year after sunspot maximum. Author

N83-10732# National Hurricane Center, Coral Gables, Fla.
A STATISTICAL DYNAMICAL MODEL FOR PREDICTION OF TROPICAL CYCLONE MOTION IN THE EASTERN NORTH PACIFIC OCEAN
Preston W. Leftwich Oct. 1981 24 p refs Document previously announced as A82-19152
(PB82-195298; NOAA-82031502; NOAA-TM-NWS-WR-169) Avail: NTIS HC A02/MF A01 CSCL 04B

A statistical dynamical model, EPHC81, was formulated to predict tropical cyclone motion in the Western North Pacific Ocean. Predictors utilized in its regression equations are obtained via a simulated analog model and numerical prognoses. Guidance from EPHC81 is transmitted directly to operational forecasters at the Eastern Pacific Hurricane (EPHC). The development and operational implementation of this model are documented. Author (GRA)

N83-10733# National Weather Service, Salt Lake City, Utah.
CENTRAL SAN JOAQUIN VALLEY TYPE MAPS
Thomas R. Crossan Dec. 1981 21 p ref
(PB82-196064; NOAA-82031503; NOAA-TM-NWS-WR-173) Avail: NTIS HC A02/MF A01 CSCL 04B

Map typing aimed at forecasting critical minimum temperatures is discussed. The various synoptic patterns that precede low minimum temperatures in the Great Valley of California were typed. Frost or subfreezing temperatures are known with all of these types. The development of damaging temperatures and their duration can be estimated without making reference to type maps by just using one or two factors (e.g., low afternoon temperatures, low dew points, cloudy or cloudless skies, etc.). However, type maps can alert one as to whether there may or may not be a damaging-temperature forecast problem when critical temperatures are not obvious, important when preparing agricultural forecasts under operational deadlines. Author (GRA)

N83-10734# Nebraska Univ., Lincoln.
SATELLITE OBSERVATIONS OF VARIATIONS IN NORTHERN HEMISPHERE SEASONAL SNOW COVER
Kenneth F. Dewey and Richard Heim, Jr. Washington NOAA Dec. 1981 87 p refs Sponsored by NOAA
(PB82-196668; NOAA-TR-NESS-87) Avail: NTIS HC A05/MF A01 CSCL 04B

The usefulness of satellite derived snow cover data, the digitized archive of snow cover data for the Northern Hemisphere, and the various climatological products that can be derived from this data base are discussed. Weekly Snow and Ice Charts of the Northern Hemisphere, which were prepared by the National Earth Satellite Service (NESS), were analyzed for the period November 1966 through December 1980. Each of these weekly charts was digitized and then stored and displayed in formats in which a star symbol stood for 50% or more of a grid box covered with snow on an O stood for no snow cover. For display purposes, all water bodies were left completely blank to allow the above two symbols to define the land areas. Although ice cover was also digitized and stored in the data archive, only snow cover is analyzed. Author (GRA)

48 OCEANOGRAPHY

Includes biological, dynamic and physical oceanography; and marine resources.

N83-10735# National Research Inst. for Oceanology, Stellenbosch (South Africa). Physical Oceanography Div.
THE ROUTINE PROCESSING AND ANALYSIS OF AANDERAA METER DATA
E. H. Schumann Nov. 1976 26 p refs
(CSIR-T/SEA-7910; ISBN-0-7988-2175-0) Avail: NTIS HC A03/MF A01

When the Shelf Dynamics Project proposed the continuous measurement of various oceanographic parameters as the mainstay of its program, the decision was also made to use Aanderaa meters for this purpose. Thus the RCM-4 was chosen to measure current speed and direction and temperature, while the TG-2A was to be used for pressure measurements to a maximum deph

of 150 m. A TG-3A meter was also acquired at a later stage to measure both temperature and pressure. A routine processing and analysis system is described together with sample outputs, showing which results will eventually be produced as a data report for every deployment. L.F.M.

N83-10736# National Weather Service, Anchorage, Alaska. Ocean Services Unit.
EMPIRICAL PROBABILITIES OF THE ICE LIMIT AND FIFTY PERCENT ICE CONCENTRATION BOUNDARY IN THE CHUCKCHI AND BEAUFORT SEAS
Bruce D. Webster May 1982 38 p refs
(AD-A116849; NWS-AR-34) Avail: NTIS HC A03/MF A01 CSCL 08/12

Semi-monthly empirical probabilities of the ice limit and 50 percent ice concentration boundary are contoured in 25 percent increments from 0 to 100 percent for the Chuckchi and Beaufort Seas from May 15 to December 1. The source information covers a 29 year period, from 1953 to 1981. Given certain assumptions, this statistical approach provides a basis for prediction of the ice extent in the long term which may be some benefit in the seasonal planning of marine operations. The ice decay and growth cycle shows a distinctive climatological pattern which is related to bottom topography, proximity to warm water sources and a semi-permanent ice circulation feature. Author (GRA)

N83-10737# Naval Oceanographic Office, Bay St. Louis, Miss. Ocean Measurements Program.
VARIABILITY IN THE MIXED LAYER DEPTH NEAR THE POLAR FRONT
William J. Teague and Ortwin H. vonZweck Apr. 1982 29 p refs
(AD-A117154; NOO-TR-287) Avail: NTIS HC A03/MF A01 CSCL 08/10

The depths of the surface mixed layer are estimated for the fall season in the Norwegian Sea and the Iceland-Faeroe Gap areas using definitions of mixed layer depth based on temperature and Brunt-Vaisala frequency. Variability in the mixed layer depth was found to be both seasonally and regionally dependent. Differences between definitions occured primarily in the frontal regions. As fall progressed, the mixed layer deepended more rapidly in the weakly stratified frontal regions than outside of those regions. Author (GRA)

N83-10738# Naval Ocean Research and Development Activity, Bay St. Louis, Miss.
A DISCRETE NONLINEAR SPECTRAL MODEL FOR OCEAN WAVE PREDICTION, DESCRIPTION OF COMPUTER PROGRAM
J. H. Allender and M. Lybanon Apr. 1982 40 p refs
(RR03105330)
(AD-A114354; NORDA-TN-147) Avail: NTIS HC A03/MF A01 CSCL 08/3

An improved spectral model for ocean wave prediction is described. The present model includes an improved representation for weak, nonlinear, wave-wave interactions that depends on spectral shape and prescribes atmospheric input that is consistent with measurements by Snyder et al. The limiting form of the spectrum is defined as a Pierson-Moskowitz spectrum with a variable saturation range parameter. Some additional constraints are also used to obtain stable spectra because there is, in effect, a mismatch between the numerous degrees of freedom of the two-dimensional wave spectrum and the level of sophistication used to represent the physical processes affecting wave growth. The focus of the present note is on the wave model computer program. The note is organized for someone wanting to implement the program. Hence, top-level flow charts, user instructions, and tape output formats are given. In addition, a detailed description of the numerical method is included. GRA

N83-10739# Environmental Research Inst. of Michigan, Ann Arbor. Applications Div.
RADIANCE CALCULATIONS FOR OPTIMIZATION OF SENSORS DESIGNED FOR REMOTE BATHYMETRY, VOLUME 1 Final Technical Report
Fred J. Tanis and Fabian Polcyn Jul. 1982 137 p refs
(Contract N00014-81-C-2350)
(AD-A117743; ERIM-155800-1-F1) Avail: NTIS HC A07/MF A01 CSCL 08/10

An extensive set of radiance calculations have been generated for each of twelve representative bottom types using an existing water radiance and atmospheric radiative transfer model. Total radiance values were calculated under two separate (Elterman) atmospheric states for a sensor platform altitude of 50 km. Calculations were also made for a sensor placed just below the sea surface. The model parameters were iterated over representative water depths and water types. A preliminary visual band optimization analysis was made over the input parameters. The suitability of LANDSAT-D Thematic mapper (TM) bands is also addressed. Author (GRA)

N83-10740# National Oceanic and Atmospheric Administration, Boulder, Colo. Office of Marine Pollution Assessment.
OCEAN POLLUTION RESEARCH, DEVELOPMENT AND MONITORING Annual Report, FY 1981
Jan. 1982 117 p refs
(PB82-219049; NOAA-82042703) Avail: NTIS HC A06/MF A01 CSCL 08J

The research summaries follow the categories of concern developed in the Federal plan for ocean pollution research, development and monitoring. These categories are: marine waste disposal, marine mining, marine energy, marine transportation, accidental discharge of oil and hazardous materials, coastal land use, and ocean pollution assessment and management of cumulative effects. GRA

N83-10741# National Oceanic and Atmospheric Administration, Washington, D. C. Ocean Technology and Engineering Services.
INTERCOMPARISON OF PRIMARY AND SECONDARY STANDARD SEAWATER SAMPLES
Michael A. Basileo and Alisa F. Akimova (USSR Academy of Sciences) Mar. 1982 18 p
(PB82-215716; NOAA-82041502; NOAA-TR-OTES-7) Avail: NTIS HC A02/MF A01 CSCL 08J

A cooperative program for determining the comparability of laboratory salinity measurements was conducted by the U.S. and USSR. The program involved the exchange and joint measurements of secondary standard seawater samples at 12 nominal salinities ranging from 5 to 40 parts per 1,000. The secondary seawater standards preparation, measurement results, and conclusions are described. GRA

N83-10742# National Oceanic and Atmospheric Administration, Miami, Fla.
ANALYSIS OF THE ACCURACY OF THE INTER-OCEAN CSTD SENSORS USED ON THE MESA NEW YORK BIGHT PROJECT Technical Memorandum, 1973 - 1979
John B. Hazelworth and Carol Roffer Boulder, Colo. Feb. 1981 55 p refs
(PB82-215815; NOAA-82042001; NOAA-TM-OMPA-16) Avail: NTIS HC A04/MF A01 CSCL 08J

A quality analysis of data collected on water sampling cruises in the New York Bight, 1973-1979, indicates that the data reported are generally good. The Inter-Ocean CSTD sensors showed improvement but were sometimes challenged by the considerable variability of this coastal environment. Other inaccurate data were the result of faulty equipment. Dissolved oxygen continues to be a difficult parameter to measure electronically. Author

N83-10743# National Oceanic and Atmospheric Administration, Seattle, Wash. Environmental Research Labs.
HYDROGRAPHIC MEASUREMENTS DURING THE 1978 COOPERATIVE SOVIET-AMERICAN TSUNAMI EXPEDITION
Patricia E. Pullen and H. Michael Byrne Oct. 1981 174 p refs
(PB82-215096; NOAA-82042301; NOAA-DR-ERL-PMEL-4) Avail: NTIS HC A08/MF A01 CSCL 08J

Hydrographic data were taken during the Second Cooperative Soviet-American Tsunami Expedition in August-September 1978. CTD and XBT stations were taken in the Pacific Equatorial region near 155 C and in the Kuroshio region. The CTD station data presented include profiles of temperature, salinity, and sigma-T versus pressure, tables of temperature, salinity, sigma-T and dynamic depth anomaly at standard pressures, and the meteorological conditions at the station. The XBT station data include profiles of temperature versus pressure and tables of temperature values at standard pressure. Author

N83-10744# National Oceanic and Atmospheric Administration, Boulder, Colo. Wave Propagation Lab.
THE MEAN AND VARIANCE OF SKYWAVE RADAR SEA-ECHO POWER SPECTRA
R. M. Jones Nov. 1981 51 p refs
(PB82-175969; NOAA-81122901; NOAA-TM-ERL-WPL-86) Avail: NTIS HC A04/MF A01 CSCL 08C

Formulas are derived for the mean and variance of skywave radar sea echo power spectra. Evaluation of the formulas for reasonable values of the parameters leads to a normalized variance between two and three. The variability of the ionospheric reflection coefficient leads to the greater variance for skywave sea echo spectra over surface wave sea echo spectra (where the normalized variance is usually one). Author (GRA)

N83-10745# National Oceanic and Atmospheric Administration, Rockville, Md. Ocean Technology and Engineering Services.
WEATHER CONSTRAINTS ON AIRBORNE LASER HYDROGRAPHY OPERATIONS
Robert Scott Jan. 1982 20 p refs
(PB82-189754; NOAA-82021005; NOAA-TM-OTES-3) Avail: NTIS HC A02/MF A01 CSCL 08J

The operational limitations imposed on laser hydrography by weather conditions are discussed. An estimate is developed of the probability of favorable weather conditions for airborne laser hydrography operations at seven sites on the east coast of the United States. For comparison purposes, similar estimates are made for launch based sonar hydrograhy and for stereo photobathymetry. Author (GRA)

N83-10746# National Oceanic and Atmospheric Administration, Rockville, Md.
THE EASTERN BERING SEA SHELF: OCEANOGRAPHY AND RESOURCES, VOLUME 2
Donald W. Hood, ed. and John A. Calder, ed. 1981 716 p refs
(PB82-181306; LC-81-600035) Avail: NTIS HC A99/MF A01 CSCL 08A

The trophic relations of seabirds of the eastern Bering Sea shelf are reviewed. Very few species of fish and invertebrates provide the major portion of foods used in any one region, although the principal prey species may vary from one region to another. Regional differences in prey use and seasonal and year to year fluctuations in food habits are documented. The potential impact of seabird foraging on their prey populations is discussed based on the consumption of between 5.8 and 11.5 x 10 ft metric tons of food annually. The consumption of juvenile walleye pollock by birds is estimated to be about 50% of the tonnage of adult fish taken for human consumption. GRA

N83-10747# National Advisory Committee on Oceans and Atmosphere, Washington, D.C.
A REPORT TO THE PRESIDENT AND THE CONGRESS BY THE NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE Annual Report
Victoria J. Jones, ed. 30 Jun. 1981 52 p
(PB82-182882; NACOA-21; AR-10) Avail: NTIS HC A04/MF A01 CSCL 08J

The National Advisory Committee on Oceans and Atmosphere (NACOA) reviewed the impact of changes being made by the Administration on ocean programs. Key aspects of the national ocean effort are reviewed and reevaluated. These range from the present review of the U.S. position in the Law of the Sea to questions about relative roles of the Federal Government, States, and private industry in important programs such as Sea Grant, Coastal Zone Management, fisheries development, and Ocean Thermal Energy Conversion (OTEC). Further, some actions postpone for later consideration important technology developments such as the National Oceanic Satellite System (NOSS). There is concern that actions are being taken piecemeal without adequate regard for the interdependence of many ocean programs and without recognition of the need for a comprehensive approach to ensure that the resources of the ocean be developed fully in the national interest while protecting it as an environment. Therefore, it is urged that the Federal Ocean Program be reviewed as a whole before further changes are made to ensure national ocean policies will be consistent with the objectives. Author (GRA)

N83-10748# Johns Hopkins Univ., Baltimore, Md.
VERTICAL MIXING AND NUTRIENT TRANSPORT IN THE CHESAPEAKE BAY Final Report
Jay L. Taft and Dong-Ping Wang Jan. 1982 55 p refs
(PB82-178708; PPRP-58) Avail: NTIS HC A04/MF A01 CSCL 08J

Nutrient transport in an estuary is described. The lower Potomac River estuary is subject to variability in physical circulation and nutrient chemistry on scales of a few days. Even in the summer, when density stratification stabilizes the water column vertically, major flow events occur which can alter both nutrient concentrations, through water advection, and chemical environment, through gas and ion diffusion along newly established gradients. Soluble inorganic phosphate which is abundant in sulfide rich deep water can be removed at the pynocline through geochemical processes if iron and, perhaps, manganese are present. In this way it is possible for phytoplankton which can migrate down to the boundary with nutrient rich deep water to grow at the maximal rate, while nonmigrating phytoplankton, uncoupled from the nutrient source, become phosphorus limited. Meteorological conditions in fall result in a water column which is usually stable but has much less pronounced nutrient gradients than in summer. Experiments with enclosed phytoplankton assemblages demontrate that vertical motion through the water column, such as occurs during a wind event, enhances phytoplankton productivity in the fall and may be a positive selection factor for nonmigrating forms. Author (GRA)

51 LIFE SCIENCES (GENERAL)

Includes genetics.

N83-10749*# National Aeronautics and Space Administration, Washington, D. C.
MORPHOLOGICAL STUDIES OF THE SKELETAL MUSCLES OF RATS DURING HYPOKINESIA
Y. Petrov, G. Kovachev, and L. Cheresharov Jun. 1982 13 p refs Transl. into ENGLISH from Veterinarnomeditsinski Nauki (USSR), v. 17, no. 9-10, 1980 p 72-83 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76887; NAS 1.15:76887) Avail: NTIS HC A02/MF A01 CSCL 06C

The skeletal musculature of two groups of Wistar strain rats were studied. A group of 60 day old members were kept in individual cells for physiologic immobilization, while the control group was raised under normal conditions. All animals were killed for tests at 450 days. Skeletal muscles of rats kept 390 days immobilized had a lower weight, muscle fiber diameter of m. semitendinosus was smaller in immobilized rats while variability in muscle fiber thickness was greater in the test group. It is found that degenerative processes involved light and dark fibers. E.A.K.

N83-10750*# Emory Univ., Atlanta, Ga. Dept. of Physiology.
CARDIOVASCULAR ADAPTATIONS DURING LONG-TERM ALTERED GRAVITY Final Report
Vojin P. Popovic 30 Sep. 1982 41 p refs

(Grant NGR-11-001-009)
(NASA-CR-169438; NAS 1.26:169438) Avail: NTIS HC A03/MF A01 CSCL 06C

Cardiovascular studies were performed on unrestrained, unanesthetized rats and on the same animals in head-down hypokinetic conditions as well as during readaptation of the same animals to free activity. Possible circulatory mechanisms that evolved in mammals during long-lasting gravity exposure are considered. These mechanisms are likely to be affected during exposure to 0-g forces. Author

N83-10751# Oak Ridge National Lab., Tenn.
HEALTH EFFECTS OF DIELECTRIC GASES: PRELIMINARY REPORT Final Report
C. E. Easterly, C. S. Dudney, G. D. Griffin, and P. J. Walsh Aug. 1982 28 p refs
(Contract W-7405-eng-26)
(DE82-019724; ORNL/TM-8353) Avail: NTIS HC A03/MF A01

The toxicity of various dielectric gases was assayed in two in vitro systems: Chinese hamster V79 (lung) cells (mammalian) and yeast (Saccharomyces cerevisiae). Exposures were carried out in small tubes which were constantly rotated, so that cells were exposed to the gas with only a thin layer of cell culture liquid covering them. Results indicate that SF6 is essentially without cytotoxic effect on both systems. After discharge of 16 kJ total spark energy in 60 cu cm of SF6, the sparked samples were found to be cytotoxic to the mammalian cells, but not to the yeast. The toxicity of these sparked samples to the mammalian system was observed within 15 min of exposure of the cells and the degree of toxicity increased with time of exposure. In addition, increasing spark energy produced samples with increased cytotoxic activity. Yeast cells were unresponsive to octafluorocyclobutane (c-C4F8) and sparked SF6. However, as little as 10% perfluoro-2-butyne (PFB) resulted in 100% toxic response to the yeast, and 95% hexafluorocyclobutene (c-C4F6) prevented their normal exponential growth, but did not result in mortality. DOE

N83-10752# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Biology.
STUDY OF BIOFOULING AND ITS CONTROL IN SRP COOLING WATER SYSTEMS Final Technical Report
Daniel H. Pope Apr. 1982 78 p
(Contract DE-AC09-76SR-00001)
(DE82-016299; DP-MS-82-43) Avail: NTIS HC A05/MF A01

The dynamics of biofouling and biocorrosion to find a control solution are examined. The following metabolic activities of organisms in a biofilm that can produce harmful conditions are identified: consumption of oxygen to produce anaerobic zones; production of organic and mineral acids; production of H2S both from inorganic sulfate by the anaerobic sulfate reducing bacteria and from the degradation of organosulfur compounds by anaerobic or facultatively anaerobic microorganisms; removal of protective films allowing the corrosion process at the metal surface to continue; and depolarization of cathodic sites by the removal of the substances causing polarization. DOE

N83-10753# Sheffield Univ. (England). Dept. of Control Engineering.
MODE ANALYSIS OF A TUBULAR STRUCTURE OF COUPLED NON-LINEAR OSCILLATORS FOR SMALL-INTESTINAL MODELLING
S. E. D. Alian and D. A. Linkens May 1982 64 p refs
(RR-186) Avail: NTIS HC A04

Mathematical modeling of small-intestinal electrical activity is described. Mode analysis of one-dimensional chains and two-dimensional arrays af nonlinear oscillators was extended to consider a tubular structure. It is shown that this structure is capable of producing stable single modes, nonresonant double modes and degenerate modes. General expressions are obtained for an mxn structure where m = number of oscillators in each ring, n = number of rings. Examples of two special conditions of 3 x 4 (i.e., odd numbers of oscillators in a ring) and 4 x 3 cases are given. The analytical results obtained for these cases were verified experimentally, using an electronic implementation of coupled van der Pol oscillators. Author (ESA)

N83-10754# Sheffield Univ. (England). Dept. of Control Engineering.
MODE ANALYSIS OF A TUBULAR STRUCTURE OF COUPLED FIFTH-POWER NON-LINEAR OSCILLATORS FOR LARGE-INTESTINAL MODELLING
S. E. D. Alian and D. A. Linkens May 1982 43 p refs
(RR-187) Avail: NTIS HC A03/MF A01

A matrix Krylov-Bovolioubov linearization technique was used to extend mode analysis to a tubular structure of oscillators, representing human large-intestinal electrical behavior. The method of averaging was used to calculate the stationary amplitude values. Mode stability was investigated for zero state, single modes, and double nonresonant modes. Theoretical results for a case with four rings each having three oscillators compare favorably with an experimental investigation, using electronic implementation of van der Pol oscillators. Author (ESA)

N83-10755# New York Sea Grant Inst., Albany.
MARINE BIOMASS: NEW YORK STATE SPECIES AND SITE STUDIES Annual Report, 1 Dec. 1980 - 30 Nov. 1981
D. F. Squires and L. McKay 1 Mar. 1982 150 p refs Prepared in cooperation with Cornell Univ., Albany, N.Y.
(PB82-216136; GRI-81/0023) Avail: NTIS HC A07/MF A01 CSCL 08A

Nine species of indigenous New York seaweeds were surveyed for potential as feedstock for methanogenesis. Laminaria and Gracilaria are primary candidates on the basis of growth studies and gas yield data provided by General Electric. Agardhiella, Codium, and Fucus merit further study. A two species (warm and cool water) cropping system appears feasible in terms of year-round sustained yield. Initial data suggest nitrogen is not limiting in New York coastal waters. Technical gains were made in affixing attached-growth-mode species to substrates. Sites for use in larger scale experimental structures around Long Island were evaluated for their environmental and use-conflict parameters. Several sites in Smithtown Bay have the requisite features. The New York Bight was evaluated for potential sites for ocean farms. Environmental and use-conflict features for this area were identified on overlay maps. Five novel biomass farm designs were engineered and tested by computer models for survivability. Novel mooring, anchoring and wave-dampening devices were also considered. Author (GRA)

N83-10756# Virginia Polytechnic Inst. and State Univ., Blacksburg.
MICROBIOLOGICAL STUDIES TOWARDS OPTIMIZATION OF METHANE FROM MARINE PLANT BIOMASS Annual Report, 1 Jul. 1980 - 30 Jun. 1981
James G. Ferry and Jiann-Shin Chen Jul. 1981 15 p
(PB82-214362; GRI-81/0009) Avail: NTIS HC A02/MF A01 CSCL 06M

The microbiological conversion of marine plant biomass was studied with stabilized kelp-degrading methane-producing enrichment cultures. Mannitol and alginate are used concurrently. Ethanol is produced shortly after feeding kelp and subsides rapidly. Dissolved hydrogen ranged from 5 nM to 1.2 uM. The appearance of ethanol correlates with increased hydrogen levels which is expected if interspecies hydrogen transfer functions to maintain low concentrations of the more reduced fermentation products. An improved method was developed for measurement of volatile fatty acids in sea water medium based on gas chromatography of the phenyl ester derivatives. Acetate and propionate were found in the greatest concentrations with formate, butyrate and isobutyrate in lower concentrations. The pool sizes will be used with turnover rate constants to determine total flux of each intermediate. A strain of Methanococcus mazei has been isolated that degrades acetate to methane. Also, a highly enriched culture of a previously unreported acetate-degrading methanogen was obtained. New strains of hydrogen and formate-utilizing methanogens were isolated. Mannitol and alginate degrading strains were isolated that resemble Cytophaga sp. Formate dehydrogenase from

Methanobacterium formicicum was purified 71-fold and initially characterized. The isolated enzyme contains a cofactor not previously reported in methaogens. Author

N83-10757# Rhode Island Univ., Kingston. Marine Ecosystems Research Lab.

A SIMPLE PLUTOMETER FOR PRECISE DETERMINATION OF DISSOLVED OXYGEN CONCENTRATION BY THE WINKLER METHOD WITH RECOMMENDATIONS FOR IMPROVING RESPIRATION RATE MEASUREMENTS IN AQUATIC ORGANISMS

Sandra L. Vargo and R. Ken Force Mar. 1982 7 p refs Sponsored by EPA

(PB82-181843; EPA-606/J-81-531; ERLN-X33) Avail: NTIS HC A02/MF A01 CSCL 08A

A photometer designed for Winkler titration end point detection is described. The precision of replicate dissolved oxygen measurements using this instrument was 0.06-0.22%. The high precision is needed to measure the small changes in dissolved oxygen concentration for determining the respiration rate of small aquatic organisms. Other recommendations for improving precision are also presented. GRA

52 AEROSPACE MEDICINE

Includes physiological factors, biological effects of radiation; and weightlessness.

N83-10758* National Aeronautics and Space Administration, Washington, D. C.

AEROSPACE MEDICINE AND BIOLOGY, A CONTINUING BIBLIOGRAPHY WITH INDEXES. SUPPLEMENT 236

Sep. 1982 78 p

(NASA-SP-7011(236); NAS 1.21:7011(236)) Avail: NTIS HC $7.00 CSCL 06E

This bibliography lists 207 reports, articles, and other documents introduced into the NASA scientific and technical information system in August 1982. M.G.

N83-10759# Naval Submarine Medical Research Lab., Groton, Conn.

DEPTH PERCEPTION WITH YELLOW GOGGLES Interim Report

JoAnn S. Kinney, S. M. Luria, Christine L. Schlichting, and David F. Neri 11 Aug. 1981 11 p refs

(NSMRL-960) Avail: NTIS HC A02/MF A01

The ability of subjects to judge depressions in the snow was studied at a cross country ski area. Many pairs of depressions were made in the snow and each subject was asked to judge which depression in each pair was deeper. The percentage of correct judgments was significantly greater on an overcast day with yellow goggles than with luminance matched neutral goggles. E.A.K.

N83-10760*# Technology, Inc., Houston, Tex. Life Sciences Div.

SPECIAL REPORT ON THE DATA COLLECTION PROGRAMS FOR THE GROUND BASED NITROGEN WASHOUT EXPERIMENT. VOLUME 2: DETAILED PROGRAM DESCRIPTIONS, LISTINGS, EXAMPLES AND HARDWARE SPECIFICATIONS

30 Jul. 1982 209 p

(Contract NAS9-14880)

(NASA-CR-167737; NAS 1.26:157737) Avail: NTIS HC A10/MF A01 CSCL 06B

Personal data input, decompression data, nitrogen washout, nitrogen data, and update computer programs are described. Input data and formats; program output, reports, and data; program flowcharts; program listings; sample runs with input and output pages; hardware operation; and engineering data are provided. N.W.

N83-10761# Defence Research Information Centre, Orpington (England).

THE ENDANGERING OF MANKIND BY MICROWAVES AND RADIO WAVES

J. Bernhardt Jun. 1982 18 p refs Transl. into ENGLISH of Deut. Med. Wochenschr., (West Germany), v. 104, no. 50, 1979 p 1757-1761

(DRIC-T-6709; BR83907) Copyright. Avail: NTIS HC A02/MF A01

Data on the effect of microwaves, radio waves, and electric and magnetic fields on man are summarized. Effect (heat or stimulation), penetration depth, organ affected, biological reactions, threshold values, and exposure time recommendations are given. Author (ESA)

N83-10762# Army Research Inst. of Environmental Medicine, Natick, Mass. Military Ergonomics Div.

CARDIORESPIRATORY RESPONSES TO VARIED EXERCISE DISTRIBUTIONS BETWEEN UPPER AND LOWER BODY MUSCLE GROUPS

M. M. Toner, M. N. Sawka, L. Levine, and K. B. Pandolf 5 May 1982 25 p refs

(DA Proj. 3E1-62777-A-878)

(AD-A115092; USARIEM-M-30/82) Avail: NTIS HC A02/MF A01 CSCL 06/19

The present study examined the influence that distributing exercise between upper (arm crank exercise) and lower (cycle exercise) body muscle groups had upon cardiorespiratory responses to constant power output (PO) exercise. Six male volunteers completed five submaximal exercise bouts at both 76 and 109 W of 7 min duration. Resulting data suggested that during upper body exercise the increased VO2 associated with increased % arm values was not accompanied by an elevated HR response when at least 40% of the PO was performed by the lower body. This might be attributed to a facilitated venous return and/or a decreased total peripheral resistance when the lower body was involved in the exercise. GRA

N83-10763# Wisconsin Univ., Madison. Dept. of Veterinary Science.

LUNG METABOLISM, FUNCTION, AND MORPHOLOGY DURING HYPEROXIC AND HYPERBARIC EXPOSURE Interim Report, 1 Jan. - 31 Dec. 1981

James A. Will Dec. 1981 14 p

(Grant AF-AFOSR-3497-78; AF Proj. 2312)

(AD-A117074; AFOSR-82-0536TR) Avail: NTIS HC A02/MF A01 CSCL 06/19

Productivity resulting from the multi-disciplinary approach we have been developing for studying 02 toxicity is obvious. We have quite thoroughly defined (both qualitatively and quantitatively) the temporal sequalae of cardiopulmonary structural changes associated with onset, duration, and intensity of 02 exposure as well as changes due to varying the rate of withdrawal from the hyperoxic environment. Theses studies in rats, rabbits, and hamsters have been extended to testing a variety of pharamacologic as well as dietary manipulations which alter tolerance to pilmonary 02 toxicity and hypoxic pulmonary vasoconstriction. At present, each bit of information obtained continues to direct us toward microsonal enzymes and serotenergie regulation. Our major goals for Year 05 involve studies directed at the involvement of these systems in the oxygen-related insults. GRA

N83-10764# Letterman Army Inst. of Research, San Francisco, Calif.

THE DEVELOPMENT AND EVALUATION OF HEMOGLOBIN SOLUTION AS A BLOOD SUBSTITUTE

Frank DeVenuto and Angelo I. Zegna 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982

(AD-A117318) Avail: NTIS HC A02/MF A01 CSCL 06/5

The development and evaluation of an effective Hb solution as a blood substitute are important not only for the care of casualties resulting from mass disasters, but also for eventual use in other special clinical situations. Substantial improvements have been made by several recent research efforts in the general purity and quality of experimental Hb solutions. Such improvements

have enabled investigators to study the potential applications of Hb solutions in far less ambiguous manner than was previously possible. These studies have produced a reasonably clear picture of the limitations of the current product and an insight for approaches in a systematic improvement. The Hb solution as presently formulated, although has the limitation of short vascular retention time, potentially could be useful in several applications such as transfusions in patients who cannot receive immediate medical assistance, but could receive blood after a few hours, or transfusions in patients who cannot receive medical care for prolonged periods of time, provided that the Hb and blood volume losses are restored by periodic or continuous infusion of Hb solution. Furthermore, the present product could be useful in open heart surgery, in organ perfusion and in situations of uncontrolled bleeding. GRA

N83-10765# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.

THE HEALING PROCESS WITH VERTEBRAL FRACTURE, WITH SPECIAL CONSIDERATION OF THE QUESTION OF TRAUMATIC SPONDYLOSIS DEFORMANS. PART 1. ANIMAL EXPERIMENTS

Alfons Lob 7 Jun. 1982 23 p refs Transl. into ENGLISH from Dtsche Z. Chir. (East Germany), v. 248, 1937 p 452-466
(AD-A117464; FTD-ID(RS)T-0506-82) Avail: NTIS HC A02/MF A01 CSCL 06/5

The occurrence of a traumatically caused localized spondylosis deformans and the healing process of vertebral fracture in general and its relation to spondylosis deformans were investigated. Serial investigations of X-rays, observations on macerated preparations, and histological findings show that: (1) vertebral fracture heals predominantly toward the endosteum with periosteal callus. The callus formation attains only moderate extent and is always limited to the fracture site and its immediate vicinity. It never leads to spondylotic edge growth or bridge formation; (2) spondylotic changes occur only after injury to the anterior fiber ring of the disc; (3) callus formation and development of spondylotic changes are two different processes which can be separated satisfactorily in every animal experiment in the X-rays, in macerated preparations, and in the histologic sections. GRA

N83-10766# Deputy Chief of Staff for Research Development and Acquisition (Army), Washington, D.C.

BIOEFFECTS DATA CONCERNING THE SAFE USE OF GaAs LASER TRAINING DEVICES

David J. Lund, Edwin S. Beatrice, and Steven T. Schuschereba Jun. 1982 14 p refs
(AD-A117810) Avail: NTIS HC A02/MF A01 CSCL 06/18

The MILES system simulates the firing of live munitions for training purposes. A gallium arsenide laser transmitter is mounted on, and boresighted with, each weapon, and all potential targets are equipped with detectors sensitive to GaAs laser radiation. When a weapon is triggered, no projectile is fired; rather a signal is transmitted from the laser and directed at the intended target. The success of the round is scored upon receipt of the signal at the target. The system is effective; however it does present a problem. The MILES system transmits laser beams at personnel; the probability of their eyes being exposed is high. It is essential that the consequences of such ocular exposure be understood to insure that the signal used for simulation does not carry potential harm. GRA

N83-10767# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio. School of Engineering.

FEEDBACK INFORMATION AND ANALYSIS FOR MICROPROCESSOR CONTROLLED MUSCLE STIMULATION M.S. Thesis

David J. Heichel Dec. 1981 141 p refs
(AD-A115532; AFIT/GE/EE/81D-26) Avail: NTIS HC A07/MF A01 CSCL 06/16

A cat was fitted with feedback sensors which provided information on joint position and foot force during unrestrained locomotion. A harness outlining the rear leg skeleton of the cast was designed. The harness was worn and supported by the animal. It contained position transducers at the joints and followed the movement of the leg throughout the step cycle. The harness restricted the rotational and lateral movements of the leg. Other feedback sensors were developed to sense foot contact and force. A simple contact switch on the ball of the foot of the cat was used with feedback harness to show exact foot placement. A force transducer designed to mount on the foot of the cat provided additional feedback from the foot. The cat was walked under different conditions to obtain position data for models of the gait cycle. Hip action with respect to a ground plane was observed for leg motion modeling. The cat was also walked on a treadmill with electromyograph activity recordings for the flexor and extensor group of each joint. This joint provided information to model the activity sequence in the muscles during locomotion. From the tabulated leg position, foot forces, hip motion and muscle activity, a model walk is presented for future microprocessor controlled stimulation experimentation for paralysis. Author (GRA)

N83-10768# Naval Ocean Systems Center, San Diego, Calif.

REMOTE MEDICAL DIAGNOSIS SYSTEM (RMDS) ADVANCED DEVELOPMENT MODEL (ADM) AT-SEA TEST RESULTS

W. T. Rasmussen, I. Stevens, P. D. Hayes, and J. West Jan. 1982 99 p refs Prepared in cooperation with WESTEC Services, Inc., San Diego, Calif.
(Contract N66001-78-C-0274; Proj. M0933PN)
(AD-A114374; NOSC-TR-690) Avail: NTIS HC A05/MF A01 CSCL 06/5

This report provides the results of at-sea experimental evaluation of video transmissions of radiographs over the Remote Medical Diagnosis System (RMDS) advanced development model terminals. The objectives of this evaluation were (1) to obtain quantitative and qualitative data on the functional parameters of the RMDS ADM terminals and components, (2) to define design risks associated with the current approach to RMDS implementation, and (3) to provide baseline data to support follow-on procurement of RMDS engineering development model (EDM) terminals. Author (GRA)

N83-10769# Naval Submarine Medical Research Lab., Groton, Conn.

FILTER STABILITY, DIAGNOSTIC CONSISTENCY, AND DURABILITY OF THE FARNSWORTH LANTERN COLOR VISION TEST Final Report

Helen M. Paulson 20 Apr. 1982 24 p refs
(MO100PN001)
(AD-A115052; NSMRL-979) Avail: NTIS HC A02/MF A01 CSCL 06/5

This Laboratory, as developer of the Farnsworth Lantern (FALANT), the U.S. Navy's color vision test, has been the recipient through the years of various queries about the test. To provide the answers, three investigations were undertaken. The filters in several 25 year old FALANTS were measured and found to still meet the transmittance, chromaticity, and neutrality specifications. Fifty nine color defectives were tested on NSMRL's FALANT and on a Naval Air Station's FALANT which was thought to be too stringent and all examinees received the same Pass/Fail results. A questionnaire evaluating the instrument's durability was sent to all the Armed Forces entrance and examining stations and the responses indicated essentially trouble free performance. Author (GRA)

N83-10770# Johns Hopkins Univ., Baltimore, Md.

HEALTH EFFECTS OF LOW LEVEL RADIATION IN SHIPYARD WORKERS Progress Report, Sept. 1981

Matanoski Sep. 1981 16 p
(Contract DE-AC02-79EV-10095)
(DE82-001112; DOE/EV-10095/1) Avail: NTIS HC A02/MF A01

In order to determine the effects of low-level doses of radiation it was necessary to define an adequate population, to gather and collate data relating to this population and to organize this data in such a manner as to render it suitable for analysis. Much of the groundwork, including the development of data

collection systems and the establishment of liaisons with public and private data resources was completed. DOE

N83-10771# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho. Safety Div.

HEALTH EFFECTS OF WELDING FUMES AND GASES

Bowen W. Huntsman Dec. 1981 29 p refs

(Contract DE-AC07-76ID-01570)

(DE82-012199; EGG-SD-5546) Avail: NTIS HC A03/MF A01

A welder's exposure to harmful effluent is dependent on variables in personnel sampling, welding technique, equipment, and environmental situations. Upon entrance into the body, the welding contaminant may cause physical symptoms, respiratory diseases, and other illnesss. Charts listing these contaminants and their effects are included. Ventilation is the preferred method of reducing employee exposure to airborne contaminants. Depending on the type of welding situation, a combination of ventilation and respiratory protection is required to achieve the desired result. DOE

N83-10772# Sandia Labs., Albuquerque, N. Mex.

RECOMMENDATIONS FOR COLOR VISION TESTING AND CRITERIA FOR ITS IMPLEMENTATION AT SANDIA NATIONAL LABORATORIES

L. L. Young, III (Univ. Autonoma de Chihuahua) and P. B. Mossman Jul. 1982 9 p refs

(Contract DE-AC04-76DP-00789)

(DE82-019826; SAND-82-1114) Avail: NTIS HC A02/MF A01

A color-vision test battery that classifies personnel according to the severity of their color vision abnormality is discussed. These tests will result in improved job placement of color-vision-deficient personnel and thereby reduce the possibility of job discrimination without adversely affecting safety, health, or logistics. Preliminary etiological and pathophysiological aspects are discussed briefly. DOE

N83-10773# National Library of Medicine, Bethesda, Md. Index Section.

MEDICAL SUBJECT HEADINGS, TREE ANNOTATIONS, 1983

Thelma Charen May 1982 125 p refs

(PB82-208653; NLM-MED-82-02) Avail: NTIS HC A06/MF A01 CSCL 05B

The Medical Subject Headings tree annotations designed for indexers and searchers are presented. The tree annotations have a two-fold purpose: first, to give a general statement on the approach indexers or searchers should pursue to a given tree, and second, to advise them of special features within that tree that they should be aware of before indexing or searching. M.G.

N83-10774# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md.

BIOMEDICAL RESEARCH, DEVELOPMENT AND ENGINEERING AT THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY Annual Report, 1 Oct. 1980 - 30 Nov. 1981

Nov. 1981 59 p refs

(PB82-184029; JHU/APL/MQR-81) Avail: NTIS HC A04/MF A01 CSCL 06E

A program of biomedical research, development, and systems engineering was developed. The expertise in engineering, physical sciences, and systems analysis acquired in defense and space research and the development to problems of medical research and health care delivery are applied. Active collaboration projects exist in biophysics, ophthalmology, neurosensory research and instrumentation development, cardiovascular systems, patient monitoring, therapeutic and rehabilitation systems, clinical information systems, and clinical engineering. The application of state of the art technology has contributed to advances in many areas of basic medical research and in clinical diagnosis and therapy through improvement of instrumentation, techniques, and basic understanding. GRA

N83-10775# National Bureau of Standards, Washington, D.C. Office of Standard Reference Data.

MEDICAL PHYSICS DATA BOOK

Thomas N. Padikal, ed. (National Cancer Inst., Bethesda, Md.) and Sherman P. Fivozinsky, ed. Mar. 1982 125 p refs Sponsored by National Cancer Inst. and American Association of Physicists in Medicine

(PB82-217175; NBS-HB-138; LC-81-600102) Avail: NTIS HC A06/MF A01 CSCL 06E

Physical and chemical data useful in medical physics is provided. The information was extracted from other published sources. General physics, nuclear medicine, diagnostic radiology, radiation therapy, and non-ionizing radiation are considered. Author (GRA)

53 BEHAVIORAL SCIENCES

Includes psychological factors; individual and group behavior; crew training and evaluation; and psychiatric research.

N83-10776# Naval Submarine Medical Research Lab., Groton, Conn.

THE RELATIONSHIP OF VISUAL EVOKED POTENTIAL ASYMMETRIES TO THE PERFORMANCE OF SONAR OPERATORS Interim Report

Christine L. Schlichting and Scott W. Kindness 11 Aug. 1981 21 p refs

(NSMRL-957) Avail: NTIS HC A02/MF A01

Interhemispheric differences in visual evoked potential amplitude in right handed sonar operators were measured. Each operator was also rated for performance while using visual sonar displays. Significant interhemispheric asymmetries were found in the group as a whole and in the better performers. Poorer performers did not show asymmetries. It is suggested that the magnitude and direction of interhemispheric asymmetries in evoked potential amplitude can be used in the prediction of performance as sonar operators. These measures could also be used to test the effect of training and watch standing schedules. E.A.K.

N83-10777*# Johns Hopkins Univ., Baltimore, Md. Div. of Behavioral Biology.

BEHAVIORAL AND BIOLOGICAL INTERACTIONS WITH SMALL GROUPS IN CONFINED MICROSOCIETIES Annual Technical Report

Joseph V. Brady and Henry H. Emurian 27 Sep. 1982 27 p refs

(Grant NAG2-139)

(NASA-CR-169445; NAS 1.26:169445) Avail: NTIS HC A03/MF A01 CSCL 05J

Requirements for high levels of human performance in the unfamiliar and stressful environments associated with space missions necessitate the development of research-based technological procedures for maximizing the probability of effective functioning at all levels of personnel participation. Where the successful accomplishement of such missions requires the coordinated contributions of several individuals collectively identified with the achievement of a common objective, the conditions for characterizing a team, crew, or functional group are operationally defined. For the most part, studies of group performances under operational conditions which emphasize relatively long exposure to extended mission environments have been limited by the constraints imposed on experimental manipulations to identify critical effectiveness factors. On the other hand, laboratory studies involving relatively brief exposures to contrived task situations have been considered of questionable generality to operational settings requiring realistic group objectives. L.F.M.

N83-10778# Illinois Univ., Champaign. Human Attention Research Lab.

INDIVIDUAL DIFFERENCES AND TIME-SHARING ABILITY: A CRITICAL REVIEW AND ANALYSIS

Phillip L. Ackerman, Walter Schneider, and Christopher D. Wickens

Mar. 1982 62 p refs
(Contracts N00014-81-K-0034; NIMH-1-R01-MH-31425; NR Proj. 154-460)
(AD-A115082; HARL-ONR-8102) Avail: NTIS HC A04/MF A01 CSCL 05/10

Statistical methods employed to test individual differences in dual-task performance and the existence of a general time-sharing ability are reviewed and extensively critiqued. Specifically, both the types of data being collected and the types of procedures used in data analysis have been inadequate to the critical evaluation of a hypothetical 'time-sharing' ability. Serious problems resulting from unsophisticated use of correlational and factor analytic procedures in methodology and analysis are discussed. GRA

N83-10779# Illinois Univ., Champaign. Human Attention Research Lab.
THE USE OF DUAL TASK PARADIGMS IN MEMORY RESEARCH: A METHODOLOGICAL ASSESSMENT AND AN EVALUATION OF EFFORT AS A MEASURE OF LEVELS OF PROCESSING
Arthur D. Fisk, William L. Derrick, and Walter Schneider Mar. 1982 29 p refs
(Contract N00014-81-K-0034; Grant NIMH-5-R01-MH-31425; NR Proj. 154-460)
(AD-A115093; HARL-ONR-8105) Avail: NTIS HC A03/MF A01 CSCL 05/10

Results from dual task experiments have often been used to make inferences concerning memorial processes. However, many dual task experiments are based on invalid methodological assumptions. Three major assumptions which are implicitly assumed by current dual task memory research are shown to be inappropriate. Criteria which should be met in dual task experiments that draw inferences from secondary task decrements are discussed. A dual task experiment meeting the proposed criteria was conducted. Contrary to previous dual task research, the present experiment demonstrates that a carefully controlled dual task experiment shows that primary task effort is neither monotonically related to levels of processing, nor does it produce better memory for verbal stimuli. It is concluded that researchers must carefully consider the assumptions inherent in any dual task experiment when designing such experiments. Author (GRA)

N83-10780# Army Research Inst. of Environmental Medicine, Natick, Mass.
RISK TAKING AS MOTIVATION FOR VOLUNTEERING FOR A HAZARDOUS EXPERIMENT
Jared B. Jobe, Stanley H. Holgate, and Thomas A. Scrapansky 20 May 1982 29 p refs
(AD-A115097; USARIEM-M-31/82) Avail: NTIS HC A03/MF A01 CSCL 05/10

Army male enlisted personnel were tested in two experiments to assess the psychological correlates of volunteering for a hazardous experiment, (Experiment 1) and a riskless, psychological experiment (Experiment 2). Subjects were given a biographical and personal habit questionnaire, IPAT Anxiety Scale, Rotter's Locus of Control Scale, and Torrance and Ziller's Life Experience Inventory. Results from Experiment 1 indicated that volunteers were significantly less anxious ($p<.01$), and more willing to take risks ($p<.01$) than were nonvolunteers. Noncommissioned officers ($p<.05$), smokers ($p<.05$), later-born children ($p<.05$), and children of lower socioeconomic class parents ($p<.05$) were significantly overrepresented among the volunteers, and the hazardous nature of the experiment appears to have determined their characteristics. In Experiment 2, the only finding was that children of mothers who had attended college ($p<.01$) were overrepresented. Results are in agreement with findings, using college students, that volunteer samples differ significantly from nonvolunteer samples, and that results vary as a function of situational variables. The study indicates that the generalizability of experimental results have important limitations. Author (GRA)

N83-10781# Army Research Inst. for the Behavioral and Social Sciences, Alexandria, Va.
MAINTAINING MOTOR SKILL PERFORMANCE
Joseph D. Hagman 18 Jun. 1982 15 p refs Presented at the Army Sci. Conf., 15-18 Jun. 1982
(AD-A117349) Avail: NTIS HC A02/MF A01 CSCL 05/9

The results of the present experiments clarify certain training issues regarding the relative contributions of presentation and testing to motor task performance. In doing so, they answer the Army's question of which training methods most effectively promote the highest levels of skill acquisition and retention. First, the results indicate that the goal of training should dictate the training method used. If the goal is a consistent and high level of acquisition, then training should emphasize repeated presentation or alternation of presentation with testing, with the latter method being preferred because of enhanced short- and long-term retention. If effective long-term retention is the goal, then training should emphasize repeated testing. Second, testing should not only be viewed merely as a means of evaluation, but also as a means of improving motor skill performance. And third, the enhanced retention associated with repeated testing can be achieved by merely changing the emphasis of training from presentation to testing. This could be done without the usual negative aspects of additional expenditures in training time, money and personnel.
Author (GRA)

N83-10782# Naval Biodynamics Lab., New Orleans, La.
IMPLICATIONS OF DUAL-TASK PERFORMANCE VARIABLES FOR DESIGN OF GENERIC WORKSTATIONS: LITERATURE REVIEW
Michael Patsfall Nov. 1981 28 p refs
(MF58524023)
(AD-A114421; NBDL-81R014) Avail: NTIS HC A03/MF A01 CSCL 05/10

This is a review of dual-task performance findings related to design of a generic workstation performance test. The effect of multiple inputs/outputs on performance is best explained in terms of overlap of input/output requirements on mental resources. Mental resources can be usefully categorized by sensory modality of input/output, stages of mental processing, and laterality of brain function. Inputs/outputs which have overlapping requirements in one of these categories generally interfere with each other.
Author (GRA)

N83-10783# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
TWO LANDINGS
Lukasz Stanislawski 7 Jun. 1982 15 p Transl. into ENGLISH from Zotnierz Pol. (Poland), v. 36, no. 28(1725), 12 Jul. 1981 p 9-10
(AD-A117466; FTD-ID(RS)T-0368-82) Avail: NTIS HC A02/MF A01 CSCL 05/9

Judgment of pilots in the Polish Air Force is discussed. Landing of supersonic aircraft on a public highway is described. L.F.M.

N83-10784# Naval Biodynamics Lab., New Orleans, La. Bureau of Medicine and Surgery.
HUMAN PERFORMANCE TESTS FOR REPEATED MEASUREMENTS: ALTERNATE FORMS OF EIGHT TESTS BY COMPUTER
Robert C. Carter and Harvey E. Sbisa (Q.E.I., Inc.) Jan. 1982 60 p refs
(MF58524002)
(AD-A115021; NBDL-82R003) Avail: NTIS HC A04/MF A01 CSCL 05/10

Eight performance tests for repeated measurements based on published tests were generated on paper by computer programs. The computer programs can be used to sample equivalent forms of the tests for any number of occasions of repeated measurement. The programs also print any specified number of copies of the alternate forms to provide for multiple subjects. The logic of the item-sampling procedures and block diagrams of the item-generated method are discussed. The FORTRAN computer programs are given as Appendices. The tests are Addition, Number Comparison, Code Substitution, Grammatical Reasoning, Fitts'

Histoform Recognition, Klien's Pattern Comparison, Neisser's Letter Search, and randomly-placed Number Search. Author (GRA)

N83-10785# National Aerospace Lab., Amsterdam (Netherlands). Vliegtuigen Afdeling.
MODELS FOR HUMAN OBSERVING, CONTROLLING AND DECISION MAKING IN A DYNAMIC SYSTEM [MODELLEN VAN HET MENSELIJK WAARNEMINGS-, REGEL- EN BESLISGEDRAG]
P. H. Wewerinke 10 Jun. 1981 16 p refs In DUTCH; ENGLISH summary
(NLR-MP-81036-U) Avail: NTIS HC A02/MF A01

The modeling approach to describing the human observer, controller and decision maker, participating in a dynamic system, is reviewed. The use of the models in the design and analysis of man machine systems is illustrated. The models are formulated in terms of linear estimation, control and decision theory. The perception and processing of information results is an internal representation of the task which can be used to control the process (optimal control model) and/or make decisions, concerning abnormal (unacceptable) system operation (human observer and decision maker model). Author (ESA)

54 MAN/SYSTEM TECHNOLOGY AND LIFE SUPPORT

Includes human engineering; biotechnology; and space suits and protective clothing.

N83-10786# Naval Postgraduate School, Monterey, Calif. Dept. of Aeronautics.
A SIMULATOR EVALUATION OF PILOT RESPONSE TO LOW FREQUENCY AIRCRAFT VIBRATION WITH AUDIO FEEDBACK M.S. Thesis
Michael Wayne Mentas Mar. 1982 93 p refs
(AD-A117540) Avail: NTIS HC A05/MF A01 CSCL 05/9

An aircraft simulator facility employing a two axis air combat maneuvering simulation with whole body virbational mode capability was used to investigate pilot response to vibration and the performance enhancement technique of audio feedback cuing. The reliability of pilot response to a tracking task was measured in both the nonvibrational and vibrational mode with audio feedback cuing as a primary stimulus in testing. In general, performance scores in all modes of testing were improved using aural tracking techniques with a significant reversal of the adverse vibration stress duration function above expected values. Detailed conclusions and recommendations are presented. Author (GRA)

N83-10787# Swedish Council for Building Research, Stockholm.
TESTING OF SLIPPERINESS: FORCES APPLIED TO THE FLOOR AND MOVEMENTS OF THE FOOT IN WALKING AND IN SLIPPING ON THE HEEL
Jun. 1981 182 p refs
(PB82-204108; ISBN-91-3669-0) Avail: NTIS HC A09/MF a01 CSCL 05E

An attempt to find a valid method for testing the slipperiness of heels during normal walking is documented. The movements of the foot and the forces applied to the floor were studied. The dependence of the coefficient of friction on different factors (such as load, velocity, temperature, lubrication, surface roughness) is discussed, as well as the consequences of these variations for different test methods. A functional method of testing slipperiness is proposed. Author (GRA)

N83-10788# Rhode Island Univ., Kingston. Dept. of Electrical Enginnering.
GENERAL METHODS TO ENABLE ROBOTS WITH VISION TO ACQUIRE, ORIENT AND TRANSPORT WORKPIECES
J. R. Birk, J. Dessimoz, R. Kelley, T. Barron, A. Beckwith, P. Brodeur, J. Crouch, R. Gramma, J. Hall, H. Martins et al Dec. 1981 154 p refs
(Grant NSF DAR-78-27337)
(PB82-202540; NSF/MEA-81022; Rept-7) Avail: NTIS HC A08/MF A01 CSCL 13I

Results are presented of a research program designed to develop general methods for robots with vision to acquire, orient, and transport workpieces. The report includes papers addressing the following topics: summaries of research on robotics from 1979-1981; an experimental robot system using vision and a parallel jaw hand for acquiring connecting rod castings; methods for acquiring workpieces from a bin and for estimating a workpiece's position and orientation; errors that occur when the normals of surface patches are estimated by radiometric techniques; and design of a special purpose image processor. Knowledge of symmetry was shown to be helpful in providing a unique estimate of a workpiece's position and orientation, and in transporting a piece to a fixture in minimal time. Author (GRA)

N83-10789# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Physics and Chemistry of Ozone Depletion.
CAUSES AND EFFECTS OF STRATOSPHERIC OZONE REDUCTION: AN UPDATE Final Report
Mar. 1982 348 p refs
(Contract EPA-68-02-3701)
(PB82-209644) Avail: NTIS HC A15/MF A01 CSCL 06R

Estimates of steady state reductions in stratospheric ozone due to continued releases of two chlorofluorocarbons at 1977 rates in the absence of other perturbations are lower than 1979 estimates by a factor between two and three. Current models suggest the steady state reduction will lie between 5 and 9%. The association of nonmelanoma skin cancers with ultraviolet-B radiation suggests that reductions in stratospheric ozone will result in increases of these cancers. Exposure to ultraviolet-B radiation has shown to adversely affect the immune response system. E.A.K.

55 PLANETARY BIOLOGY

Includes exobiology and extraterrestrial life.

No abstracts in this category.

59 MATHEMATICAL AND COMPUTER SCIENCES (GENERAL)

N83-10790# Oak Ridge National Lab., Tenn. Computer Sciences Div.
KWIC INDEX FOR NUMERICAL ALGEBRA
J. A. Carpenter Mar. 1982 123 p Supplement to ORNL-4778
(Contract W-7405-eng-26)
(DE82-008144; ORNL/CSD-96) Avail: NTIS HC A06/MF A01

An index for numerical algebra is presented. The following topics are reported: infinite matrices, matrices over fields of positive characteristic, operator theory, optimizaton and those facets of matrix theory primarily combinatorial in nature. The review citations are limited to the Mathematical Reviews (MR) and Das Zentralblatt fur Mathematik Und Ihre Grenzgebiete (ZBL). DOE

60 COMPUTER OPERATIONS AND HARDWARE

Includes computer graphics and data processing.
For components see *33 Electronics and Electrical Engineering.*

N83-10791 Johns Hopkins Univ., Baltimore, Md.
UPSETS IN MICROPROCESSOR CONTROLLERS Ph.D. Thesis
Robert Edward Glaser 1982 307 p
Avail: Univ. Microfilms Order No. DA8205099

An approach is taken which combines fault, hardware, and software together into one overall model. This model is shown to be useful for the consideration of intermittent/transient faults. It supports a method, based on the concept of a containment set, for realizing transient fault tolerance without massive redundancy. It also allows for an approach to system fault tolerance evaluation and validation which uses a transition matrix which is defined in terms of the containment set. This containment set approach for fault tolerance is specifically applied to microprocessor controllers. An experimental system developed for use as a testbed to facilitate the evolution of this tolerance method is described. Results with general implications to practical fault tolerant design of microprocessor controllers are obtained for the testbed system. This is accomplished by means of a characterization of pronram structures which leads to the formation of a loop program set which is proven to be a containment set for the testbed processor. The extension of the containment set approach to larger computer systems is discussed. Dissert. Abstr.

N83-10792# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
GOULD CONCEPT 32/87 FORTRAN 77+ RELEASE 3.0 Validation Summary Report
4 Dec. 1981 16 p refs Sponsored by Gould, Inc.
(PB82-182700; FCTC-81/125) Avail: NTIS HC A02/MF A01 CSCL 09B

A consolidated summary of the results obtained from the validation of the subject compiler against the 1974 FORTRAN Standard is given. Several sections show the descrepancies found, if any. These include an overview of the validation which lists all categories of descrepancies within X3.9-1978, and a detailed listing of discrepancies together with the tests which failed. GRA

N83-10793# Sandia Labs., Albuquerque, N. Mex. Project Design Definition Div.
AGS-880 MENU SYSTEM USER GUIDE
Ken Gentry and David J. Renninger Jul. 1982 119 p
(Contract DE-AC04-76DP-00789)
(DE82-019955; SAND-82-1543) Avail: NTIS HC A06/MF A01

The AGS-880 Menu System is described. The system uses a mylar menu overlay on the CADS terminal tablet which allows the user a more effective use of the system by providing a means to execute specific commands or series of linked system commands. DOE

N83-10794# California Univ., Livermore. Lawrence Livermore Lab.
OVERVIEW OF THE LINCS ARCHITECTURE
J. G. Fletcher and R. W. Watson 13 Jan. 1982 17 p
(Contract W-7405-eng-48)
(DE82-010600; UCID-19294) Avail: NTIS HC A02/MF A01

The large scale computer systems, on which much of scientific computing depends, are evolving into multiprocessor systems. A node is defined as one or more processors with a local (shared) high speed memory. The environment consists of: multiple nodes communicating over noisy channels with arbitrary delays and throughput, heterogenous base resources and information encodings, no single administration controlling all resources, distributed system state, and no uniform time base. The system design problem is how to turn the heterogeneous base hardware/firmware/software resources of this environment into a coherent set of resources that facilitate development of cost effective, reliable, and human engineered applications. The Livermore Interactive Network Communication System (LINCS) is a hierarchical architecture designed to meet following needs: developing a layered, communication oriented distributed system architecture; layered and modular to support ease of understanding, reconfiguration, extensibility, and hiding of implementation or nonessential local details; communication oriented because that is a central feature of the environment. DOE

N83-10795# Pacific Northwest Lab., Richland, Wash.
DIAGNOSTICS FOR MULTIPLE-REGRESSION PROBLEMS
J. C. Daly Mar. 1982 102 p refs Sponsored in part by NSF
(Contract DE-AC06-76RL-01830)
(DE82-013629; PNL-4208) Avail: NTIS HC A06/MF A01

Linear regression diagnostics research is reviewed. DOE

N83-10796# EUROSIL G.m.b.H., Eching (West Germany).
DEVELOPMENT OF AN EIGHT-BIT MICROPROCESSOR COMPONENT FAMILY IN CMOS TECHNOLOGY Final Report, Jun. 1980
Gerhard Moegen, Ronald Rathbone, and Gottfried Wotruba Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 30 p In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-089; ISSN-0340-7608) Avail: NTIS HC A03/MF A01; Fachinformationszentrum, Karlsrune, West Germany DM 6,50

An eight bit microprocessor, the E 3200, was developed. The development project was divided into two parts, system and logic design, and development of technologies suitable for smaller structures. The development task of the first part was completed. Development of technology results in considerable increase in integration density. A detailed estimate of the area of the CPU with the design rules valid during the first half of 1980 shows the packing density to be insufficient to guarantee economic success for such a complex device. Realistic chances of success can only be expected with 40,000 A line widths and gaps, which are now possible. Author (ESA)

N83-10797# EUROSIL G.m.b.H., Eching (West Germany).
DEVELOPMENT OF A SINGLE CHIP MICROPROCESSOR IN CMOS SILICON GATE TECHNOLOGY. FURTHER DEVELOPMENT OF FOUR BIT MICROPROCESSOR CONCEPT IN CMOS TECHNOLOGY Final Report, Dec. 1980
Richard Forster, Robert Jones, Guenther Meusburger, Gerhard Moegen, and Gottfried Wotruba Bonn Bundesministerium fuer Forschung und Technologie Jun. 1982 82 p refs In GERMAN; ENGLISH summary Sponsored by Bundesministerium fuer Forschung und Technologie
(BMFT-FB-T-82-088; ISSN-0340-7608) Avail: NTIS HC A05/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 17

Optimization of the one chip microprocessor in metal gate technology used in clocks was decided. The development was executed in two steps: the first one brought modifications to hard and software which permited reduction in current consumption from 12 microampere to 3.5 microampere. The second step was the inclusion of a 1:2 development lead to the four bit, one chip microprocessor for industrial use. A study of the feasibility of variable ratio LCD multiplexing (1:N) was included, the device being constructed with the optimal 1:3 ratio. A 1.5 V 256 times four bits RAM, with a four bit multiplexer data address interface with only eight connection pins was also developed to permit extension of the microprocessor RAM. Author (ESA)

N83-10798# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
VALIDATION SUMMARY REPORT NCR CORPORATION V8570 VRX COBOL 30
Jan. 1982 73 p
(PB82-185554; FCTC-81/138) Avail: NTIS HC A04/MF A01 CSCL 09B

This Validation Summary Report (VSR) for the NCR Corporation V8570 VRX COBOL 30 running under VRX Release 9 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard (X3.23-1974/FIPS PUB 21-1). The compiler was validated against the High level of FIPS PUB 21-1. The VSR is made up of several sections showing all the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level/module within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. Author

N83-10799# Federal Compiler Testing Center, Falls Church, Va. Sibley Data Systems.
A FUNCTIONAL SPECIFICATION OF THE RELATIONAL DBMS. I: MANDATORY FUNCTIONS ONLY Final Report
Edgar H. Sibley Feb. 1982 103 p Sponsored by NBS
(PB82-182965; NBS-GCR-82-372) Avail: NTIS HC A06/MF A01 CSCL 09B

A set of mandatory and optional functions is specified for a relational calculus interface to a relational data base management system (R-DBMS). A basic description of data base management and the relational method are presented. Extensions to this basic specification are discussed and a set of generally distinct additions that the user may choose to require are specified. The INGRES of UC Berkeley and SQL/DS of IBM systems are examined for their degree of compliance with the mandatory functions. This comparison shows that either the mandatory requirements are too rigid, or that current systems have some practical deficiencies. Author (GRA)

N83-10800# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
GOULD CONCEPT 32/87, COBOL RELEASE 1.2
4 Dec. 1981 15 p refs Sponsored by Gould, Inc.
(PB82-182486; FCTC-81/142) Avail: NTIS HC A02/MF A01 CSCL 09B

Programs from modules were run in conjunction with the testing of the COBOL Release 1.2 compiler to test its compliance to the high intermediate level of Federal Standard COBOL. The COBOL modules and levels indicated are extensions to the high intermediate level, therefore the results from these tests are noted. GRA

N83-10801# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
GOULD CONCEPT 32/87, COBOL RELEASE 1.2 Validation Summary Report
4 Dec. 1981 78 p refs Sponsored by Gould, Inc.
(PB82-182494; FCTC-81/124) Avail: NTIS HC A05/MF A01 CSCL 09B

Individual COBOL language elements whose implementation does not conform to American National Standard Programming Language COBOL, X3.23-1974 (ANS COBOL), and to Federal Standard COBOL as adopted from the American National Standard by Federal Information Processing Standard 21-1 (FIPS PUB 21-1) were identified. The results of running the COBOL compiler validation system (CCVS) were analyzed. The CCVS consists of audit routines contaning features of Federal Standard COBOL, their related data, and an executive routine (VP-routine) which prepares the audit routines for compilation. Each audit routine is a COBOL program which includes many tests and supporting procedures indicating the result of the tests. GRA

N83-10243# Kockums A.B., Malmoe (Sweden).
A COMPUTER-CONTROLLED MEASURING SYSTEM HAVING 128 ANALOG MEASURING CHANNELS AND FACILITIES FOR SIGNAL ANALYSIS
K. Hellqvist *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 121-128 (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 09/2

61 COMPUTER PROGRAMMING AND SOFTWARE

Includes computer programs, routines, and algorithms.

N83-10802 Illinois Univ., Urbana-Champaign.
PROGRAMMING LANGUAGES FOR BIT-SERIAL ARRAY MACHINES Ph.D. Thesis
Dennis Michael Mancl 1981 85 p
Avail: Univ. Microfilms Order No. DA82-03521

A programming language for numerical linear algebra problems was implemented that generates code for the Goddard-Goodyear MPP. The basic data types of the language are vector, matrix, and banded matrix. The operations include matrix-vector multiplication, Jordan exchange, and orthogonal transformations. Dissert. Abstr.

N83-10803*# Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
PREDICTOR SYMBOLOGY IN COMPUTER-GENERATED PICTORIAL DISPLAYS Final Report
Arthur J. Grunwald Nov. 1981 121 p refs
(Contract NASw-3302)
(NASA-CR-169441; NAS 1.26:169441; TAE-470) Avail: NTIS HC A06/MF A01 CSCL 09B

The display under investigation, is a tunnel display for the four-dimensional commercial aircraft approach-to-landing under instrument flight rules. It is investigated whether more complex predictive information such as a three-dimensional perspective vehicle symbol, predicting the future vehicle position as well as future vehicle attitude angles, contributes to a better system response, and suitable predictor laws for the predictor motions, are formulated. Methods for utilizing the predictor symbol in controlling the forward velocity of the aircraft in four-dimensional approaches, are investigated. The simulator tests show, that the complex perspective vehicle symbol yields improved damping in the lateral response as compared to a flat two-dimensional predictor cross, but yields generally larger vertical deviations. Methods of using the predictor symbol in controlling the forward velocity of the vehicle are shown to be effective. The tunnel display with superimposed perspective vehicle symbol yields very satisfactory results and pilot acceptance in the lateral control but is found to be unsatisfactory in the vertical control, as a result of too large vertical path-angle deviations. Author

N83-10804*# Technology, Inc., Houston, Tex. Life Sciences Div.
SPECIAL REPORT ON THE DATA COLLECTION PROGRAMS FOR THE GROUND BASED NITROGEN WASHOUT EXPERIMENT. VOLUME 1: USER'S GUIDE
Penelope A. Bueker 30 Jul. 1982 58 p 2 Vol.
(Contract NAS9-14880)
(NASA-CR-167739; NAS 1.26:167739) Avail: NTIS HC A04/MF A01 CSCL 09B

The Nitrogen Washout System measures nitrogen elimination on a breath basis from the body tissues of a subject breathing pure oxygen. The system serves as a prototype for a Space Shuttle Life Sciences experiment and in the Environmental Physiology Laboratory. Typically, a subject washes out body nitrogen for three hours while breathing oxygen from a mask enclosed in a positive-pressure oxygen tent. A nitrogen washout requires one test operator and the test subject. A DEC LSI-11/02 computer is used to (1) control and calibrate the mass spectrometer and Skylab spirometer, (2) gather and store experimental data and (3) provide limited real time analysis and more extensive post-experiment analysis. Five programs are used to gather and store the experimental data and perform all the real time control and analysis. Author

N83-10805 Michigan Univ., Ann Arbor.
THEORY OF TESTING COMPUTER PROGRAMS Ph.D. Thesis
John Stewart Gourlay 1981 132 p
Avail: Univ. Microfilms Order No. DA8204662

The theoretical works on program testing by Goodenough and Gerhard, Howden, and Geller are unified and generalized by a new theoretical framework for testing. The framework provides a mechanism for comparing the power of methods of testing programs based on the degree to which the methods approximate program verification. The framework also provides a reasonable and useful interpretation of the notion that successful tests increase one's confidence in the program's correctness. Applications of the framework include confirmation of a number of common assumptions about practical testing methods. Among the assumptions confirmed is the need for generating tests from specifications as well as programs. On the other hand, a careful formal analysis of assumptions surrounding mutation analysis shows that the competent programmer hypothesis does not suffice to ensure the claimed high reliability of mutation testing. A method for generating test data from specifications expressed in predicate calculus is described. Dissert. Abstr.

N83-10806*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
THE COST OF SOFTWARE FAULT TOLERANCE
Gerard E. Migneault Sep. 1982 13 p refs Presented at the AGARD Avionics Panel Fall Meeting, The Hague, 6-9 Sep. 1982
(NASA-TM-84546; NAS 1.15:84546) Avail: NTIS HC A02/MF A01 CSCL 09B

The proposed use of software fault tolerance techniques as a means of reducing software costs in avionics and as a means of addressing the issue of system unreliability due to faults in software is examined. A model is developed to provide a view of the relationships among cost, redundancy, and reliability which suggests strategies for software development and maintenance which are not conventional. M.G.

N83-10807# TRW, Inc., Redondo Beach, Calif.
VMOMS: A COMPUTER CODE FOR FINDING MOMENT SOLUTIONS TO THE GRAD-SHAFRANOV EQUATION
L. L. Lao, R. M. Wieland, W. A. Houlberg, and S. P. Hirshman Feb. 1982 57 p refs
(DE82-008142; ORNL/TM-7871) Avail: NTIS HC A04/MF A01

A code VMOMS is described which finds approximate solutions to the Grad-Shafranov equation describing scalar pressure-balance equilibria for axisymmetric Tokamak plasmas. A Fourier series expansion of the flux surface coordinates (R,Z) is made in terms of two new coordinates (rho, theta), and the resulting equation is conveniently reduced to a system of ordinary differential equations using a variational principle. The solution of these simple equations with pressure and current as driving functions, yields, in principle, a complete description of the equilibrium. Complete axisymmetry is assumed, as well as up-down symmetry about the toroidal midplane. DOE

N83-10808# Naval Postgraduate School, Monterey, Calif.
AN INTERACTIVE COMPUTER PROGRAM FOR THE PRELIMINARY DESIGN AND ANALYSIS OF MARINE REDUCTION GEARS M.S. Thesis
Joseph Louis Paquette Mar. 1982 198 p refs
(AD-A117828) Avail: NTIS HC A09/MF A01 CSCL 09/2

An interactive computer program providing flexibility in the design and analysis of marine propulsion gears is discussed. The program, Reduction Gear Analysis and Design, will handle conventional parallel axis and simple epicyclic reduction gears. It is capable of generating preliminary designs of new gear sets or of providing analyses of existing or proposed gear sets. Program development, organization, and operation are discussed. R.J.F.

N83-10809# Desmatics, Inc., State College, Pa.
FACTORS SCREENING IN SIMULATION: EVALUATION OF A RANDOM BALANCE/PLACKETT-BURMAN STRATEGY
Carl A. Mauro and Dennis E. Smith Jul. 1982 28 p refs
(Contract N00014-79-C-0650; NR Proj. 277-291)
(AD-A117529; TR-113-6) Avail: NTIS HC A03/MF A01 CSCL 09/2

Large, complex simulation models usually must be studied by performing a number of simulation runs. It is often to our advantage to invest a relatively small number of runs in a preliminary experiment aimed at screening out the most important factors. The major experimental effort and expense can then be focused on these key factors. In this report we evaluate the performance of a two-stage screening strategy that is based on a combination of random balance and Plackett-Burman designs. GRA

N83-10810# Dayton Univ., Ohio. Research Inst.
A PREPROCESSOR SYSTEM FOR FINITE ELEMENT ANALYSIS Final Report, Mar. 1980 - Sep. 1981
Robert A. Brockman, Ted S. Bruner, and Kent A. Primrose Wright-Patterson AFB, Ohio AFWAL Feb. 1982 252 p refs
(Contract F33615-80-C-3403; AF Proj. 2402)
(AD-A117544; UDR-TR-81-147; AFWAL-TR-81-3180) Avail: NTIS HC A12/MF A01 CSCL 09/2

A preprocessor system developed for use in connection with three-dimensional finite element analysis is described. The system consists of several data entry modules, a central preprocessor and various data translation and conversion utilities. Data entry and generation functions include keyboard, digitizer and file inputs, which are oriented toward the type of thick shell geometry currently encountered in aircraft transparency analysis. The main preprocessor operates on models in 'superelement' form, permitting selective mesh refinement, numerous geometric transformations, and merging of separate models to form the final analysis mesh. Data reformatting modules permit the generation of a complete input file for finite element analysis, and/or the translation of finite element data into other forms for archiving or further processing external to the preprocessor itself. Author (GRA)

N83-10811# Range Commanders Council, White Sands Missile Range, N. Mex. Data Reduction and Computing Group.
SOFTWARE ENGINEERING, 7TH SEMINAR
2 Feb. 1982 153 p refs Seminar held at Nellis AFB, Nev., 2 Feb. 1982
(AD-A117995) Avail: NTIS HC A08/MF A01 CSCL 09/2

The lack of specific classification and qualification standards in the Federal Government for positions in the field of software engineering is discussed. The efforts to develop the software engineering occupational series is described. The interim approaches and field activities for alleviating the problems of recruiment and retention, undefined career paths and salary inconsistencies are considered. GRA

N83-10812# Los Alamos Technical Associates, Inc., N. Mex.
ODD USER MANUAL: THE OTHER DATA DISPLAY
Kenneth A. Klare Apr. 1982 49 p
(Contract W-7405-eng-36)
(DE82-013750; LA-9314-M) Avail: NTIS HC A03/MF A01

The ODD is a program designed to provide the user with a simple means to do problems analogous to but beyond the scope of a hand held calculator. It can manipulate arrays and produce plotted results. It uses reverse Polish notation to implement calculator like commands entered on a terminal. It interfaces to the experimental data base used in the Controlled Thermonuclear Research Division of the Los Alamos National Laboratory. It is written in FORTRAN and uses the terminal's graphic capabilities. It should be useful to anyone wanting to do a calculation of simple to moderate complexity even if that problem does not involve experimental data. DOE

N83-10813# Oak Ridge National Lab., Tenn.
GRAF11: X-Y GRAPH GENERATION LIBRARY
S. R. Maddox Jun. 1982 28 p refs
(Contract W-7405-eng-26)
(DE82-016320; ORNL/CSD-TM-173) Avail: NTIS HC A03/MF A01

The GRAF11 is a FORTRAN subroutine library that allows the PDP-11 user to readily produce well-labeled X-Y graphs of precollected data. Most display control parameters can be reset by call or allowed to default, providing both simplicity and great flexibility. The following terminal types are supported: Tektronix

4006, 4010, 4025, 4027, 4051 (also certain terminals which have been retro-fitted to accept Tektronix-style commands: ADM-3, VT100). Other terminal drivers can easily be added, due to modular design. The package is written in standard FORTRAN and has been compiled under the following systems: RSX-11M with FORTRAN-4 PLUS, RSTS/E with FORTRAN-4. DOE

N83-10814# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics Div.
SLAVE: A PACKAGE OF ENHANCEMENTS FOR THE VAX/VMS EDT TEXT EDITOR
Mark L. Blaanford and Hugh L. Scott May 1982 37 p refs
(Contract DE-AC04-76DP-00789)
(DE82-019827; SAND-82-0726) Avail: NTIS HC A03/MF A01

Several enhancements for the editor are presented, along with instructions for and examples of their use. The SLAVE package includes a command procedure to initialize and run the editor, an improved string search and substitution facility, keystrokes to simplify multibuffer editing, several miscellaneous functions, and setup mode to customize the editor to particular applications. The regular EDT help utility was augmented to include information on these features. DOE

N83-10815# Santa Clara Univ., Calif. School of Engineering.
A GRAPH THEORETIC ALGORITHM FOR HIERARCHIAL DECOMPOSITION OF DYNAMIC SYSTEMS
V. Pichai, M. E. Sezer, and D. D. Siljak Livermore, Calif. California Univ., Livermore. Lawrence Livermore Lab. 24 Mar. 1982 42 p refs
(Contract W-7405-eng-48)
(DE82-013224; UCID-19354) Avail: NTIS HC A03/MF A01

A graph theoretic scheme is proposed for partitioning of dynamic systems into hierarchially ordered subsystems having independent inputs and outputs. The resulting subsystems are input-output reachable as well as structurally controllable and observable, so that a piece-by-piece design of estimators and controllers can be accomplished for systems with large dimensions without excessive computer requirements. DOE

N83-10816# Sandia Labs., Albuquerque, N. Mex.
MATRIX MODEL OF DIGITAL SYSTEMS AND ITS USE IN AUTOMATIC TEST GENERATION
Charlotte Acken May 1982 90 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017640; SAND-82-0792) Avail: NTIS HC A05/MF A01

A mathematical model describing digital integrated circuits at the logic gate level is formulated. The model contains explicit information about the behavior of each logic gate in the circuit and about the entire circuit topology. The complexity of the model is shown to be linear in the number of lines in a gate level logic diagram of the circuit. DOE

N83-10817# Sandia Labs., Livermore, Calif.
SDL: SANDIA STRUCTURAL DESIGN LANGUAGE. A USER'S MANUAL
Evelyn L. Mathey Mar. 1982 69 p refs
(Contract DE-AC04-76DP-00789)
(DE82-013524; SAND-82-0175) Avail: NTIS HC A04/MF A01

The Sandia structural design language (SDL) serves as primary input language to the Sandia computer aided design system. The SDL compiler, in concert with the SADIST data basing program and SHE, the Sandia hierarchical executive, provides an environment in which the circuit designer can work in a top down structural decomposition and bottom up structural implementation manner. Instructions for describing circuits with SDL and for running the SDL compiler are provided. Interfaces with other programs in the CAD system are discussed. Examples and illustrations are provided. DOE

N83-10818# Sandia Labs., Albuquerque, N. Mex. Distributed Processing System Design Div.
FUNCTIONAL SPECIFICATION OF THE SANDIA VIRTUAL DEVICE INTERFACE (SVDI)
Karen M. Erickson and Randall W. Simons Feb. 1982 28 p
(Contract DE-AC04-76DP-00789)
(DE82-014522; SAND-81-1900) Avail: NTIS HC A03/MF A01

The Sandia Virtual Device Interface (SVDI) is a set of graphics functions designed to support graphics packages. It is device independent, meaning it can produce plots on any graphics device once an appropriate driver is written. It is computer independent, meaning it can be implemented on a wide variety of computer systems. The SVDI allows multiple graphics packages on multiple computer systems to share a single driver for each supported graphics device, thus minimizing the amount of code to be written and maintained. DOE

N83-10819# California Univ., Livermore. Lawrence Livermore Lab.
FORIG: A MODIFICATION OF THE ORIGEN2 ISOTOPE-GENERATION AND DEPLETION CODE FOR FUSION PROBLEMS
James A. Blink 3 Mar. 1982 12 p refs
(Contract W-7405-eng-48)
(DE82-016133; UCRL-53263) Avail: NTIS HC A02/MF A01

Use of the FORIG computer code to solve isotope generation and depletion problems in fusion and fission reactors is described. FORIG is an adaptation of ORIGEN2 to run on a Cray-1 computer, and to accept more extensive activation cross sections. DOE

N83-10820# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics Div. 2.
IMPROVEMENTS IN CSQII: AN IMPROVED NUMERICAL CONVECTION ALGORITHM
J. Michael McGlaun Jan. 1982 38 p refs
(Contract DE-AC04-76DP-00789)
(DE82-014264; SAND-82-0051) Avail: NTIS HC A03/MF A01

An improved numerical convection algorithm is used in the Eulerian wavecode CSQII to calculate the mass, momentum, internal energy, and kinetic energy fluxes between the Eulerian cells. The algorithm assigns a linear intracell distribution to a convected quantity. A monotonicity scheme is used to inhibit nonphysical oscillations. Theoretical analysis and example calculations indicate a dramatic improvement in resolution is possible. DOE

N83-10821# Union Carbide Corp., Oak Ridge, Tenn. Computer Sciences Div.
DATA BASE SIMULATOR
David J. Pack Mar. 1982 56 p
(Contract W-7405-eng-26)
(DE82-013342; ORNL/CSD/TM-171) Avail: NTIS HC A04/MF A01

The features of an input to a computer program written for the purpose of generating data bases whose data values contain deterministically known errors are discussed. The development of the computer program was motivated by the need to assess automatic data editing procedures for data validation of real data bases. The observed values in the simulated data are the sum of generated true values and generated error values. For a given variable, true data values may be generated by any of the following six methods: frequency distribution, conditional frequency distribution, analysis of variance model, multiple regression model, time series model, and membership within a defined constrained region. The error values for a given variable may be simulated from an independent distribution or from a distribution dependent upon the error values of other specified variables. The computer program described can be used to satisfy other needs in the area of data simulation beyond the specific need expressed above. Since the addition of errors to the true values is optional, one may readily simulate observed data for variables using one or more of the six previously listed methods. DOE

N83-10822# California Univ., Livermore. Lawrence Livermore Lab. Methods Development Group.
ORION: AN INTERACTIVE POST-PROCESSOR FOR THE ANALYSIS CODES NIKE2D, DYNA2D, AND TACO2D

John O. Hallquist Jan. 1982 43 p refs
(Contract W-7405-eng-48)
(DE82-010710; UCID-19310) Avail: NTIS HC A03/MF A01

A user's manual for the postprocessor ORION is presented. The ORION reads the binary plot files generated by the two dimensonal finite element codes currently used and plots contours, time histories, and deformed shapes. Contours of a large number of quantities may be plotted on meshes consisting of triangular and quadrilateral elements. The ORION computes a variety of strain measures, interface pressures along slide lines, reaction forces along constrained boundaries, and momentum. DOE

N83-10823# California Univ., Livermore. Lawrence Livermore Lab.
SOFTWARE TOOLS AND MORE FOR MODCOMP COMPUTERS
Edward D. Luebke Dec. 1981 42 p
(Contract W-7405-eng-48)
(DE82-007985; UCID-19287) Avail: NTIS HC A03/MF A01

Programming on Modcomp computers can be made easier with several software tools, or utilities. Some utilities used by the Modcomp users of LLNL are presented. For the greatest utility, these tools were written so as to run on all series of Modcomp computers. DOE

N83-10824# Oak Ridge National Lab., Tenn. Computer Sciences Div.
SURVEY OF FORTRAN SUBROUTINES SUITABLE FOR SOLVING STIFF OSCILLATORY ORDINARY DIFFERENTIAL EQUATIONS
P. W. Gaffney Feb. 1982 106 p refs
(Contract W-7405-eng-26)
(DE82-007790; ORNL/CSD/TM-134) Avail: NTIS HC A06/MF A01

The application of existing packaged software to the numerical solution of stiff oscillatory ordinary differential equations was considered. By applying the software to a sequence of model problems, it is possible to identify the difficulties that may be encountered when the codes are to be used in more realistic applications. These difficulties and the effects of using the software on different computers are highlighted. DOE

N83-10825# Sandia Labs., Albuquerque, N. Mex. Statistics and Computing Div.
AN ITERATIVE ALGORITHM TO PRODUCE A POSITIVE DEFINITE CORRELATION MATRIX FROM AN APPROXIMATE CORRELATION MATRIX (WITH A PROGRAM USERS GUIDE)
Ronald L. Iman and James M. Davenport (Texas Technological Univ.) Jun. 1982 52 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017351; SAND-81-1376) Avail: NTIS HC A04/MF A01

An explanation of an algorithm is presented that, when executed, will operate on any symmetric approximate correlation matrix by iteratively adjusting the eigenvalues of this matrix. The objective of this algorithm is to produce a valid, positive definite, correlation matrix. Also a description of a program (called POSDEF) which implements the algorithm is given. DOE

N83-10826# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.
SPARSE LINEAR PROGRAMMING SUBPROGRAM
Richard J. Hanson and Kathie L. Hiebert Dec. 1981 47 p refs
(Contract DE-AC04-76DP-00789)
(DE82-011783; SAND-81-0297) Avail: NTIS HC A03/MF A01

A subprogram, SPLP (), for solving linear programming problems is described. The package of subprogram units comprising SPLP () is written in FORTRAN 77. The subprogram SPLP () is intended for problems involving at most a few thousand constraints and variables. The subprograms are written to take advantage of sparsity in the constraint matrix. A very general problem statement is accepted by SPLP (). It allows upper, lower, or no bounds on the variables. Both the primal and dual solutions are returned as output parameters. The package has many optional features. Among them is the ability to save partial results and then use them to continue the computation at a later time. DOE

N83-10827# Oak Ridge National Lab., Tenn.
PORTABLE SOFTWARE PACKAGE FOR NONLINEAR PARTIAL DIFFERENTIAL EQUATIONS
J. W. Neuberger and R. J. Renka Apr. 1982 39 p refs
(Contract W-7405-eng-26)
(DE82-013512; ORNL-CSD-102) Avail: NTIS HC A03/MF A01

A storage-efficient method and associated software package for the solution of a general class of second-order nonlinear partial differential equations are described. The method is essentially an iterative scheme for the least squares minimization of a finite difference discretization of the residual. The advantages of this approach are its ability to treat a wide range of problems (it is type-independent) and its low storage requirements - O(N) for N grid points. The effectiveness of the method is based on a gradient-smoothing technique which increases the rate of convergence of the iterative procedure. DOE

N83-10828# Oak Ridge National Lab., Tenn. Health and Safety Research Div.
INTERACTIVE STATISTICAL-DISTRIBUTION-ANALYSIS PROGRAM UTILIZING NUMERICAL AND GRAPHICAL METHODS
S. R. Glandon and D. E. Fields Apr. 1982 90 p refs
(Contract W-7405-eng-26)
(DE82-013341; ORNL-5813) Avail: NTIS HC A05/MF A01

The TERPED/P program is designed to facilitate the quantitative analysis of experimental data, determine the distribution function that best describes the data, and provide graphical representations of the data. A printer-plotter was added for graphical output flexibility. Graphical and numerical tests are performed on the data in accordance with the user's assumption of normality or lognormality. Statistical analysis options include computation of the chi-squared statistic and its significance level and the Kolmogorov-Smirnov one-sample test confidence level for data sets of more than 80 points. Plots can be produced on a Calcomp paper plotter, a FR80 film plotter, or a graphics terminal using the high-resolution, DISSPLA-dependent plotter or on a character-type output device by the printer-plotter. The plots are of cumulative probability (abscissa) versus user-defined units (ordinate). The program was developed on a PDP-10 and consists of 1500 statements. The language used in FORTRAN-10, an extended version of FORTRAN-4. DOE

N83-10829# Los Alamos Scientific Lab., N. Mex.
USER'S MANUAL FOR DISPAK, AN EASY APPROACH TO DISSPLA GRAPHICS
Charles Shell, Thomas Kwan, and John Cary (Texas Univ., Austin) Dec. 1981 35 p
(Contract W-7405-eng-36)
(DE82-010902; LA-9061-M) Avail: NTIS HC A03/MF A01

DISPAK is a package of FORTRAN subroutines designed to allow easy use DISSPLA graphics for basic x-y plots. Simple calls are provided to initialize and dispose of the graphics output files. Plotting features include the ability to draw basic grids and curves, multiple curves on a graph, multiple subplots on a page, and high-quality presentation-type plots. For more complicated graphics needs, the user has direct access to all the powerful capabilities of DISSPLA itself. The version of DISPAK described in this report is written for the Los Alamos CDC 7600 computers. A version is available for the Crays as well. DOE

N83-10830# Hanford Engineering Development Lab., Richland, Wash.
GUIDELINES FOR TECHNICAL REVIEWS OF SOFTWARE PRODUCTS
N. P. Wilburn Mar. 1982 39 p refs
(Contract DE-AC06-76FF-02170)
(DE82-013411; HEDL-TC-2132) Avail: NTIS HC A03/MF A01

A guideline is given for technical review of products developed during a software life cycle. Purposes and benefits of reviews are

given. Varieties of reviews, when they should take place, roles of the reviewers, and products of the review are described. DOE

N83-10831# General Atomic Co., San Diego, Calif.
APPLICATION OF A FLOATING POINT SYSTEMS AP190L ARRAY PROCESSOR TO FINITE ELEMENT ANALYSIS
R. C. Young Apr. 1982 135 p
(Contract DE-AT03-76ET-35301)
(DE82-015239; GA-A-16719) Avail: NTIS HC A07/MF A01

The implementation of a finite element program on a Floating Point Systems AP190L array processor attached to a Univac 1182 host computer is discussed. The array processor was used to reform all calculations on the global system of linear equations including matrix assembly, matrix factoring an vector solution. A large scratch disk was attached directly to the array processor for storing the factored matrix. The remaining calculations, including data preparation, element matrix formation, stress integration and output display were performed by the host computer. DOE

N83-10832# Argonne National Lab., Ill. Applied Mathematics Div.
SIX LANGUAGE EXTENSIONS TO ENHANCE THE PORTABILITY OF MATHEMATICAL SOFTWARE WRITTEN IN PL/I: BACKGROUND AND JUSTIFICATION
Kenneth W. Dritz May 1982 39 p refs
(Contract W-31-109-eng-38)
(DE82-017660; ANL-82-29) Avail: NTIS HC A03/MF A01

Six extensions to PL/I are proposed. The new features include environmental enquiry functions, generalization of restricted expressions (compile-time expressions), liberalization of the contexts of restricted expressions, a named-literal declaration type, explicit precision specification for constants, and a pragmatic statement for expressing conditions that an implementation must satisfy for acceptable compilation. Used together, these features will give numerical analysts access to properties of an implementation's floating-point arithmetic in exactly the ways required to ease the burden of tailoring a program's precision specifications to new environments. In many cases it will be possible to write PL/I programs that are completely self-adapting to their host environment. Effective definition of the environmental enquiry functions will require the incorporation of an explicity parameterized model of floating-point arithmetic. If such a model is integrated into the standard, numerical analysts will be able to state and prove theorems about their programs' error bounds by appealing directly to the standard. DOE

N83-10833# Sheffield Univ. (England). Dept. of Control Engineering.
UTILISATION OF PERKIN-ELMER OPERATING SYSTEM FEATURES TO OPTIMISE PROGRAMMING EFFICIENCY
L. S. Gray and A. S. Morris 1981 30 p
(RR-180) Avail: NTIS HC A03/MF A01

The functioning of the operating system and its interaction with computer hardware are explained. Memory areas reserved for particular system functions, disk file structure, and data organization are discussed. Multiterminal monitor operations are outlined. The mechanics and implementation of overlaying are treated. Author (ESA)

N83-10834# Sheffield Univ. (England). Dept. of Control Engineering.
EFFICIENT FORTRAN PROGRAMMING PRACTICE
A. S. Morris and L. S. Gray 1982 19 p
(RR-182) Avail: NTIS HC A02/MF A01

The concept of structured programming is explained and benefits of this approach, e.g., the reduction of compilation or logic errors during program development, are indicated. Features of FORTRAN 77 which can be exploited when writing structured programs are discussed. Ways to reduce program size, and input output planning are considered. Author (ESA)

N83-10835# Research Inst. of National Defence, Stockholm (Sweden).
A SUGGESTED MESSAGE STRUCTURE STANDARD FOR GILT
Jacob Palme Feb. 1982 42 p refs
(FOA-C-10199-M6) Avail: NTIS HC A03/MF A01

Techniques for the transfer of information across a number of fully independent computer based message systems interconnected via X.25 networks are discussed. A standard for the exchange of functional commands between widely differing systems is proposed. It has a basic class which is simple to implement even on small computers, but processes more advanced optional features for more advanced systems. It facilitates cooperation between systems, enabling advanced computerized conference systems to act as message clearing houses for less advanced mail systems. Author (ESA)

N83-10836# Plagman Group, Inc., New York, N.Y.
ENTITY TYPES AND RELATIONSHIPS (FOR A DATA DICTIONARY SYSTEM) Final Report
Bernard Plagman Aug. 1981 28 p refs
(Contract NB81-SBCA-0733)
(PB82-203688; NBS-GCR-82-386) Avail: NTIS HC A03/MF A01 CSCL 09B

The specification for the Federal Information Processing Standard Data Dictionary System (FIPS DDS) under development by the Institute for Computer Sciences and Technology is envisioned to consist of a basic or 'core' module, with a set of optional modules containing advanced features. A proposed set of entities, relationships, and attributes for inclusion in the core module of the FIPS DDS is presented. Full extensibility is recommended for inclusion in the core module. Author (GRA)

N83-10837# Plagman Group, Inc., New York, N.Y.
INTERACTIVE LANGUAGE CHARACTERISTICS FOR A DATA DICTIONARY SYSTEM Final Technical Issue Paper
Bernard Plagman Aug. 1981 18 p
(Contract NB81-SBCA-0733)
(PB82-203696; NBS-GCR-82-387) Avail: NTIS HC A02/MF A01 CSCL 09B

The functional specifications for the Federal Information Processing standard Data Dictionary System is under development. The interactive language of the system is considered. The features and functions of the language are presented from the perspectives of four different types of DDS user. Requirements for specific functions are developed using each user's needs. Possible forms of the interactive language are discussed. GRA

N83-10838# Alpha Omega Group, Inc., Harvard, Mass.
ENTITY TYPES AND RELATIONSHIPS (FOR A DATA DICTIONARY SYSTEM), PHASE 1 Final Report
Henry C. Lefkovits Aug. 1981 12 p
(Contract NB81-SBCA-0735)
(PB82-200403; NBS-GCR-82-384) Avail: NTIS HC A02/MF A01 CSCL 09B

A proposed set of entities, relationships and attributes for inclusion in the core module of the Federal Information Processing Standard Data Dictionary is given. A subset of the extensibility facility, called derivation, is recommended for the core standard, together with attribute type extensibility. Optional module facilities are also mentioned. GRA

62 COMPUTER SYSTEMS

Includes computer networks.

N83-10839 Northwestern Univ., Evanston, Ill.
MARKOV RELIABILITY MODELS FOR REPAIRABLE DISTRIBUTED SYSTEMS Ph.D. Thesis
Moshe Lerner Liron 1981 182 p
Avail: Univ. Microfilms Order No. DA8204933

A hierarchical view of fault tolerant distributed computers is presented, viewing a distributed system as composed of interconnected, interacting functional subsystems called component

machines. Each component machine, modeled by a directed state graph, is governed by internal random failure events and counteracting recovery processes, and also by coupling of external events from other machines. It is shown that the system is governed by a multidimensional Markov process, with nonMarkov machine processes, as components. Mathematical properties of this general model are formally analyzed. To derive performance measures, the steady-state probability and visitation rate of each system state and machine state are derived. Consideration is given to computational complexity and the sufficient conditions for reduction of computational efforts by approximation methods. The general model is specialized to the class of homogeneously distributed computer systems. Closed form solutions for various reliability and throughput measures are derived for gracefully degrading and standby spare architectures. Results obtained from this model are validated against actual statistical data from the No. 1 ESS system with very good fit. Dissert. Abstr.

N83-10840*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.
THE ECONOMICS OF TIME SHARED COMPUTING: CONGESTION, USER COSTS AND CAPACITY
Carson E. Agnew Oct. 1982 22 p refs
(Contract NASw-3204; Grants NSF GJ-36392X; NSF IST-81-08350)
(NASA-CR-169446; NAS 1.26:169446; SU-45) Avail: NTIS HC A02/MF A01 CSCL 09B

Time shared systems permit the fixed costs of computing resources to be spread over large numbers of users. However, bottleneck results in the theory of closed queueing networks can be used to show that this economy of scale will be offset by the increased congestion that results as more users are added to the system. If one considers the total costs, including the congestion cost, there is an optimal number of users for a system which equals the saturation value usually used to define system capacity. Author

N83-10841# Sandia Labs., Albuquerque, N. Mex. Applied Mathematics Div.
TIME-SHARING COMPARISONS OF SEVERAL COMPUTERS
M. R. Scott, W. H. Vandevender, K. Haskell, and E. L. Walton Feb. 1982 43 p refs
(Contract DE-AC04-76DP-00789)
(DE82-014514; SAND-82-0361) Avail: NTIS HC A03/MF A01

The results of performing a series of time sharing tests on several computers are described. The tests were designed to match the current work load on the CDC-6600 which is runnin the NOS 1.4 Level 518 operating system. An internal stimulator was used to handle a hypothetical work load. The primary purpose was to determine the response time as a function of the number of terminals used in the simulation. DOE

N83-10842# Los Alamos Scientific Lab., N. Mex.
CASUAL USER PROJECT: PROBLEMS, PROPOSED SOLUTIONS, AND IMPLEMENTATION
Joan Prommel May 1982 60 p refs
(Contract W-7405-eng-36)
(DE82-016407; LA-9244-MS) Avail: NTIS HC A04/MF A01

Responses to requests from the Computer User's Priorities Task Force 2 addressing the needs of casual users of the Los Alamos Computing Network are presented. Problems, proposed solutions, and the status of implementation of those proposed solutions are discussed for seven major categories. These categories are orientation, education, physical reorganization, user input, documentation, consulting services, and user/network interface. DOE

N83-10843# Technical Research Centre of Finland, Espoo. Telecommunications Lab.
INTERCOMMUNICATION BETWEEN OPEN NETWORKS
Jan Ekberg 1981 19 p refs
(PB82-205188; VTT-RN-37-1981; ISBN-951-38-1318-5) Avail: NTIS HC A02/MF A01 CSCL 09B

The results of the Finnish research project "Intercommunication between open networks' are described. The needs for data communication between organizations were analyzed by presenting the result of the investigation of the actual opinion within industry, banks etc., in Finland. Author

N83-10844# Federal Compiler Testing Center, Falls Church, Va. Office of Software Development.
BURROUGHS CORPORATION LARGE SYSTEMS COBOL 74 Validation Summary Report
Dec. 1980 71 p refs Sponsored by Burroughs Corp.
(PB82-185547; FCTC-81/136) Avail: NTIS HC A04/MF A01 CSCL 09B

The Burroughs Corporation Large Systems COBOL 74 provides a consolidated summary of the results obtained from the validation of the subject compiler against the 1974 COBOL Standard. Several sections show the discrepancies found, if any. These include an overview of the validation which lists all categories of discrepancies by level or modular within X3.23-1974, a section relating the categories of discrepancies to each of the Federal Levels of the language, and a detailed listing of discrepancies together with the tests which failed. GRA

63 CYBERNETICS

Includes feedback and control theory.

For related information see also *54 Man/System Technology and Life Support.*

N83-10845# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).
SENSITIVITY REDUCTION IN LINEAR SYSTEM OBSERVERS
Antonio Felix Martins Neto Jun. 1982 5 p refs In PORTUGUESE; ENGLISH summary Presented at the 4th Brazilian Conf. on Automation Campinas, Sao Paulo, Brazil, 14-17 Sep. 1982
(INPE-2447-PRE/146) Avail: NTIS HC A02/MF A01

A method for reducing the sensitivity of linear system observers is presented. Starting with an initial design for a Luenberger observer, a Riccati equation is established. Its solution permits the acquisition of a new observer for which the integral of a quadratic form of the observer error is decreased or, in the worst case, is kept unchanged. This result confirms the existence of duality between the observer problem and the sensitivity problem of systems. M.G.

N83-10846 Columbia Univ., New York.
CONTRIBUTIONS TO REDUCED ORDER CONTROL THEORY Ph.D. Thesis
Pierre Tshimanga Kabamba 1981 107 p
Avail: Univ. Microfilms Order No. DA8204498

Reduced order control theory, i.e., the control of large systems by other systems (controllers) of lower order, is discussed. The problem arises whenever, as is often the case, a large (possibly infinite) order system is to be controlled by a small controller of finite order. First the question of the assignability of the eigenvalues of the closed loop state matrix of a system by choice of a feedback gain matrix is treated. The approach proposed here has an essentially local character. The concept of local complete assignability is introduced which allows the eigenvalues of the closed loop state matrix to be arbitrarily perturbable by perturbations of the feedback gain matrix. Necessary and sufficient conditions for local complete assignability are derived. In special cases these conditions yield known criteria for controllability and observability. Although complete controllability and observability of the system (i.e., completeness) are shown to be necessary conditions for complete assignability, the question of the assignability of incomplete systems is also addressed. It is shown that dynamic compensation and direct output feedback lead to the same formalism in such a way that the results derived apply to both cases. An algorithm is presented to compute a feedback matrix performing the desired pole assignment. The question of optimal reduced order control is also treated. A general formalism is

presented here for the optimal design of controllers of arbitrary prescribed order, the cost functionals being the usual quadratic penalties with additional penalties on the controller parameter magnitudes. Dissert. Abstr.

N83-10847 Maryland Univ., College Park.
APPROXIMATE SOLUTIONS TO QUEUEING NETWORKS WITH STATE DEPENDENT PARAMETERS Ph.D. Thesis
Jonathan Russell Agre 1981 175 p
Avail: Univ. Microfilms Order No. DA8205209

A queueing discipline called weighted processor sharing is defined for multiclass queueing networks. This discipline models a first-come, first-serve discipline within each class, with the eligible members of all classes processor shared at the server. The weighted processor shared discipline is shown to result in non-product form networks except for the special case of a single server. Queueing networks with weighted processor shared disciplines are representables as queueing networks with state dependent parameters. Four approximation schemes which may be used to derive the steady state distribution for state dependent queueing networks are presented. Two of the approximation schemes are based on estimates of certain conditional distributions of the model. Conditions are derived under which these estimates yield exact results. In addition, a method for combining these conditional distribution is presented which reduces the storage and time requirements of previous techniques. The second two schemes are based on product form estimates of the steady state distribution. The product form approximations allow more efficient solution algorithms but are not as accurate as the algorithms based on conditional distributions. Dissert. Abstr.

N83-10848*# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 2: SPACE PROJECTS OVERVIEW Final Report
Rene H. Miller, Marvin L. Minsky, and David B. S. Smith Aug. 1982 182 p
(Contract NAS8-34381)
(NASA-CR-162080-Vol-2; NAS 1.26:162080-Vol-2; SSL-22-82-Vol-2) Avail: NTIS HC A09/MF A01 CSCL 09B

Applications of automation, robotics, and machine intelligence systems (ARAMIS) to space activities, and their related ground support functions are studied so that informed decisions can be made on which aspects of ARAMIS to develop. The space project breakdowns, which are used to identify tasks ('functional elements'), are described. The study method concentrates on the production of a matrix relating space project tasks to pieces of ARAMIS. S.L.

N83-10849*# Massachusetts Inst. of Tech., Cambridge. Artificial Intelligence Lab.
SPACE APPLICATIONS OF AUTOMATION, ROBOTICS AND MACHINE INTELLIGENCE SYSTEMS (ARAMIS). VOLUME 4: APPLICATION OF ARAMIS CAPABILITIES TO SPACE PROJECT FUNCTIONAL ELEMENTS Final Report
Rene H. Miller, Marvin L. Minsky, and David B. S. Smith Aug. 1982 288 p
(NASA-CR-162082-V0l-4; NAS 1.26:162082-Vol-4; SSL-24-82-Vol-4) Avail: NTIS HC A13/MF A01 CSCL 09B

Applications of automation, robotics, and machine intelligence systems (ARAMIS) to space activities and their related ground support functions are studied, so that informed decisions can be made on which aspects of ARAMIS to develop. The specific tasks which will be required by future space project tasks are identified and the relative merits of these options are evaluated. The ARAMIS options defined and researched span the range from fully human to fully machine, including a number of intermediate options (e.g., humans assisted by computers, and various levels of teleoperation). By including this spectrum, the study searches for the optimum mix of humans and machines for space project tasks. S.L.

N83-10850# Geo-Centers, Inc., Newton, Mass.
A REVIEW OF THREE-DIMENSIONAL VISION FOR ROBOTICS
Interim Technical Report
May 1982 60 p refs
(Contract DNA001-79-C-0208; ARPA Order 3089)
(AD-A118055; GC-TR-82-158.4(A)) Avail: NTIS HC A04/MF A01 CSCL 06/4

The technologies appropriate to the collection and interpretation of three-dimensional data for robotics applications are reviewed. Included are optical stereoscopy, proximity sensing, laser scanning and structured light. Specifications for current systems are presented and areas of potential improvement are identified. Author (GRA)

N83-10851# California Univ., Livermore. Lawrence Livermore Lab.
POWERFUL TOOL FOR DESIGN ANALYSIS OF LINEAR CONTROL SYSTEMS
A. S. Maddux, Jr. 10 May 1982 122 p
(Contract W-7405-eng-48)
(DE82-015141; UCID-19373) Avail: NTIS HC A06/MF A01

An engineering systems design to analyze electronic or mechanical systems is presented. A practical quick and inexpensive method for analyzing the linear control (feedback) systems once they have been designed into the electronic or mechanical hardware was designed. The PET, operating with several peripherals via the IEEE 488 Bus, brings a complete set of office tools for analyzing these system designs. DOE

N83-10852# Sheffield Univ. (England). Dept. of Control Engineering.
ROBUST STABILITY OF SMITH PREDICTOR CONTROLLERS FOR TIME-DELAY SYSTEMS
D. H. Owens and A. Raya Apr. 1982 29 p refs
(RR-179) Avail: NTIS HC A03/MF A01

Smith predictor control structures for multivariable process plant with separable delays on the output are considered. The robustness of the control scheme with respect to mismatch between the real plant and its model, and to simultaneous changes in plant dynamic is analyzed. The cases of additive and feedback mismatch are examined, using a contraction mapping fixed point theorem. Frequency domain results for feedback mismatch in a typical Smith scheme reduce to the inverse Nyquist array criterion as plant and model delays tend to zero. Results are presented graphically as stability criteria. Author (ESA)

N83-10853# Sheffield Univ. (England). Dept. of Control Engineering.
CONTROLLABILITY, OPTIMAL CONTROL AND RECEDING HORIZON CONTROL OF DISTRIBUTED MULTIPASS PROCESSES
S. P. Banks 1982 33 p refs
(RR-181) Avail: NTIS HC A03/MF A01

The controllability of a multipass process, defined by an evolution equation on a Hilbert space (H) is discussed. The operator defining this system is shown to generate a sequence of semigroups on subspaces of H. The linear quadratic solution was found as a noncausal operator and as a causal representation. It is shown that if the system matrices form an approximately controllable pair, the receding horizon principle can be extended to linear multipass processes. Author (ESA)

64 NUMERICAL ANALYSIS

Includes iteration, difference equations, and numerical approximation.

N83-10854# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.
WHAT IS STIFFNESS?
Lawrence F. Shampine May 1982 29 p
(Contract DE-AC04-76DP-00789)
(DE82-017639; SAND-82-0782) Avail: NTIS HC A03/MF A01

The classical theory of the numerical solution of $y' + f(x,y)$

using step-by-step methods supposes that f satisfies a Lipschitz condition and that the Lipschitz constant is not large compared to the length of the interval of integration. At each step, codes select a step size small enough that the numerical solution pass an accuracy test, but no smaller than necessary. Other factors may require this step to be reduced, hence impair efficiency of solution, but in the classical situation none severely reduces the step size, with the possible exception of output. Some problems with large Lipschitz constants cannot be solved at all using step-by-step methods. There are extremely important problems which can be solved, but factors unimportant when the Lipschitz constant is small are then dominant. To avoid severe restrictions on the step size, the classical approach must be greatly altered in both theory and practice. DOE

N83-10855# Sandia Labs., Albuquerque, N. Mex. Systems Analysis and Technology Applications Div.
CORRELATION AND MOMENT PROPERTIES RELATING NUMERICAL INTEGRATION AND STOCHASTIC INTEGRALS
J. Mark Richardson and James R. Rowland (Oklahoma State Univ., Stillwater) Apr. 1982 47 p refs
(Contract DE-AC04-76DP-00789)
(DE82-016088; SAND-81-1944) Avail: NTIS HC A03/MF A01

Correlation between the input noise and system dynamics is shown to be a unifying concept in the digital simulation of nonlinear stochastic systems. More specifically, in order to obtain a unique output time response, this correlation must be provided in addition to the nonlinear system dynamic equations, initial conditions, and inputs. Based on first and second moment properties, it is shown that no correlation is present for the Ito stochastic integral, which corresponds to multi-step numerical integration formulas. In the same context, a nonzero correlation is obtained with the Stratonovich stochastic integral and with corresponding single-step (Runge-Kutta) numerical integration formulas. Digitally, this correlation is introduced by the repeated use of each noise increment in the evaluation of the integral. Numerical examples include an optimal nonlinear filter and an air pollution concentration model. DOE

N83-10856*# New York Univ., New York. Mathematics and Computing Lab.
HIGH-RESOLUTION SCHEMES FOR HYPERBOLIC CONSERVATION LAWS
Ami Harten (Tel-Aviv Univ.) Mar. 1982 66 p refs
(Contracts NCA2-0R525-101; DE-AC02-76ER-03077)
(NASA-CR-169381; NAS 1.26:169381; DE82-015473; DOE/ER-03077/175) Avail: NTIS HC A04/MF A01

A class of new explicit second order accurate finite difference schemes for the computation of weak solutions of hyperbolic conservation laws is presented. These highly nonlinear schemes are obtained by applying a nonoscillatory first order accurae scheme to an appropriately modified flux function. The so derived second order accurate schemes achieve high resolution while preserving the robustness of the original nonoscillatory first order accurate scheme. DOE

N83-10857# Sandia Labs., Albuquerque, N. Mex. Computational Physics and Mechanics Div.
ARTOO: AN AUTOMATICALLY REZONING TWO-DIMENSIONAL LAGRANGIAN FINITE DIFFERENCE WAVECODE
J. W. Swegle Dec. 1981 43 p refs
(Contract DE-AC04-76DP-00789)
(DE82-006997; SAND-81-2235) Avail: NTIS HC A03/MF A01

The ARTOO, an automatically rezoning Lagrangian wavecode based on the finite difference wavecode TOODY and its associated rezoning code TOOREZ is discussed. Using an overlay structure, ARTOO employs TOODY and TOOREZ in nearly standard forms, with a third subroutine included to link the two. Many automatic rezoning options are available to the user, including mesh distortion measures which may be used to determine when rezoning is needed. DOE

N83-10858# Sandia Labs., Albuquerque, N. Mex.
SHOULD THE EXTRAPOLATED MIDPOINT RULE BE SMOOTHED
L. F. Shampine and L. S. Baca Feb. 1982 13 p refs
(Contract DE-AC04-76DP-00789)
(DE82-008488; SAND-82-0317) Avail: NTIS HC A02/MF A01

The extrapolated midpoint rule is a popular way to solve the initial value problem for a system of ordinary differential equations. The implementations of this method smooth the results to remove a weak instability. Whether smoothing is worth the cost is considered. It is not necessary and perhaps not even desirable. DOE

N83-10859# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ON SCATTERING AND EVERYWHERE DEFINED SCATTERING OPERATORS FOR NONLINEAR KLEIN-GORDON EQUATIONS
Philip Brenner 1982 44 p refs
(CTH-Math-1982-09) Avail: NTIS HC A03/MF A01

Asymptotic properties of solutions of the nonlinear Klein-Gordon equation (NLKG) which are inherited from the corresponding solutions of the linear Klein-Gordon equation (KG) are investigated. In particular, the finiteness of time integrals in L sub q over positive R of certain Sobolev norms in space of the solution is proved to be such an hereditary property. It is shown that under suitable restrictions on the nonlinearity, the scattering operator for the NLKG is defined on all of L (sup 1) sub 2 x L sub 2 for n = 3 and 4. Author (ESA)

N83-10860# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ON THE MAXIMAL FUNCTION FOR THE MEHLER KERNEL
Peter Sjoegren 1982 12 p refs
(CTH-Math-1982-8) Avail: NTIS HC A02/MF A01

The Lebesgue measure form of the Mehler kernel is analyzed. The n-dimensional Hermite polynomials are defined so as to be orthogonal with respect to the canonical Gaussian measure gamma. In terms of these polynomials, M sub gamma is expressed. The operators M sub gamma are bounded and of norm 1 on L (sup p) sub gamma, 1 < or = p < or = infinity, and they are self-adjoint on L (sup 2) sub gamma. Further, they are given by a positive kernel and leave constant functions invariant. This makes the maximal theorem from semigroup theory applicable and works even in infinite dimensions. The one-dimensional case is cited. The same thing in arbitrary finite dimensions is proven. Author (ESA)

N83-10861# Chalmers Univ. of Technology, Goteborg (Sweden). Dept. of Mathematics.
ARITHMETICAL QUADRATIC SURFACES OF GENUS 0, 2
J. Brzezinski 1982 25 p refs
(CTH-Math-1982-10) Avail: NTIS HC A02/MF A01

Results are presented on resolution of singularities of conic bundle surfaces that are defined by lattices on ternary quadratic spaces. If M is a surface which corresponds to a lattice, then its normalization corresponds to the Bass closure of this lattice. If M is a normal conic bundle surface, then there exists a sequence of conic bundle surfaces M = M sub zero, M sub 1, ..., M sub N such that M sub (i + 1) is an elementary transform of M sub i at the singular points of one of the fibers of M sub i for i = 0,1, ..., n-1, with M sub N regular. In the case of integral quadratic forms, these results give a process of resolution of singularities which consists in normalization of a quadratic form, followed by a sequence of elementary transformations, ending with a regular quadratic form. Author (ESA)

N83-10862# Research Inst. of National Defence, Stockholm (Sweden).
A NUMERICAL INVESTIGATION OF SOME QUADRATIC POLYNOMIALS CONTAINING A HIGH DENSITY OF PRIMES, PART 1
Staffan Wrigge Dec. 1981 141 p refs
(FOA-C-10195-M8) Avail: NTIS HC A07/MF A01

Quadratic polyminals, containing a high density of primes, were studied. Methods for factoring these polynominals in order to look for prime numbers in the an squared + bn + c sequence are discussed. Prime factors (p) of the Euler polynomial (E), p between 41 and 10039, are listed. The least value of n, such that f(n) = (E) is identical with O (mod p), is given. Factorization of f(n) = (E) from n = 1 to 5000 is presented. Solutions of the congruence E is identical with a (mod 163), (a/163) = 1, and the smallest solution n of the congruence f(n) is identical with O (mod f squared (K)), K from 1 to 25 are set out. Counts of primes for Euler and Karst polynomials from 1 to 1400, and for the Euler polynomial up to 5000 are provided. Euler and Karst prime number candidates between 10 billion to 10 billion + 100, and the longest run of composite numbers of the form f(n) = E, n between 1 and 10,000 are given. Author (ESA)

N83-10863# Rochester Univ., N. Y. Coll. of Engineering and Applied Science.
EXPLOITING SPATIAL AND STRUCTURAL LOCALITY IN GEOMETRIC MODELLING Ph.D. Thesis
Robert Bruce Tilove Oct. 1981 154 p refs
(Grants NSF DAR-78-25359; NSF DAR-78-17064)
(PB82-212937; NSF/MEA-81021; TM-38) Avail: NTIS HC A08/MF A01 CSCL 12A

The design of efficient algorithms for use with geometric modeling systems that include constructive solid geometry representation of objects is discussed. The research is aimed at understanding and organizing computational strategies that seek to exploit spatial and representational (or structural) locality to improve the average efficiency of geometric algorithms. Common examples of ad hoc locality strategies including various forms of boxing and tree pruning are provided. Case studies of the null- and same-object detection problem, the wireframe generation problem, and the wireframe update problem are included. The thesis is shown to contribute: (1) a unifying mathematical framework based on localizations of objects relative to other objects and equivalent subtrees to represent localizations; (2) improved and relatively efficient algorithms for solving the three problems illustrated by case studies; (3) worst- and average-case analyses of the efficiencies of locality based algorithms for the wireframe generation problem; and (4) identification of important topics for further research. Author

N83-10864# Physical Research Lab., Ahmedabad (India).
NUMERICAL SOLUTION OF LINEAR PARABOLIC PARTIAL DIFFERENTIAL EQUATION WITH INFINITE RANGE FOR SPACE VARIABLE
N. Hussain, S. K. Rao, and P. Sharma 1980 22 p
(PB82-188905; PRL/TN-80-05) Avail: NTIS HC A02/MF A01 CSCL 12A

The Crank-Nicholson scheme is used in solving a general linear parabolic partial differential equation with infinite range for space variable. A feature of the algorithm is the transformation of the space variable to make the spatial grid equally spaced between zero and infinity. This procedures saves efforts as well as computer time. M.G.

N83-10255# Westinghouse Research and Development Center, Pittsburgh, Pa.
STUDY OF GUYAN REDUCTION OF TWO DEGREE OF FREEDOM SYSTEMS
F. H. Wolff, A. J. Molnar, and J. A. Gribik (Basic Technology, Inc.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 11-18 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

N83-10256# NKF Engineering Associates, Inc., Vienna, Va.
A METHOD FOR ESTIMATING THE ERROR INDUCED BY THE GUYAN REDUCTION
Gary L. Fox *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 19-24 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

N83-10258*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
A PARAMETRIC STUDY OF THE IBRAHIM TIME DOMAIN MODAL IDENTIFICATION ALGORITHM
Richard S. Pappa and Samir R. Ibrahim (Old Dominion Univ.) *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 43-72 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 12/1

N83-10010# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A DYNAMIC REDUCING ITERATIVE METHOD FOR SOLVING LARGE GENERALIZED EIGENVALUE PROBLEMS
Wen Zhang and Zhikun Hou *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 80-92 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 13 p Original language document announced as A82-22116 (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

N83-10015# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
A RAPIDLY RECURSIVE METHOD FOR THE B-SPLINES
Qisun Yuan *In its* Acta Aeron. Astronautica Sinica (FTD-ID(RS)T-0285-82) 23 Jun. 1982 p 144-155 refs Transl. into ENGLISH from Acta Aeron. Astronautica Sinica (China), v. 2, no. 3, Sep. 1981 12 p (For primary document see N83-10003 01-01)
Avail: NTIS HC A08/MF A01 CSCL 01/2

65 STATISTICS AND PROBABILITY

Includes data sampling and smoothing; Monte Carlo method; and stochastic processes.

N83-10865 Northwestern Univ., Evanston, Ill.
GERM-MARKOV PROCESSES Ph.D. Thesis
David Michael Malon 1981 123 p
Avail: Univ. Microfilms Order No. DA8204937

The behavior of strong germ-Markov processes during visits to holding states, the splitting of sigma algebras at germ-Markov times, and the relationship between germ sigma algebras at random times T and germs at random times T sub n approximating T from above are described. Conditions under which random time changes with respect to continuous additive functionals preserve the strong germ-Markov property are given and the germ-Markov property is preserved under the operation of killing with respect to multiplicative functions. Circumstances under which Markov processes, while not strongly Markovian, are nonetheless strongly germ-Markovian are described and settings in which the only autonomous germ-Markov processes are in fact Markov processes are described. Continuous semiMarkov processes that have the autonomous germ-Markov property are also characterized.
Dissert. Abstr.

N83-10866 Michigan Univ., Ann Arbor.
SUPERPOSITION OF MARKOV RENEWAL PROCESSES Ph.D. Thesis
Mark Becker 1981 148 p
Avail: Univ. Microfilms Order No. DA8204589

The superposition of Markov renewal processes is investigated to derive the probability that such a pooled process is in a given state at a given time or that such a process will go next to one state given that it is now in another. In addition, the distribution of the waiting time in going from one state to another state is found for the superposed process. These results are made possible by the derivation of the joint distribution of forward and backward recurrence time in an ordinary Markov renewal process. Certain results of Cox and Smith for superposed renewal processes are

extended. For the superposed Markov renewal process, the distribution of recurrence time of a given state is obtained along with the asymptotic variance of the number of visits to a given state. Application is made to a human eproduction model and a predator-prey model. A FORTRAN source program is provided for the simulation of superposed Markov renewal processes. Termination Markov renewal processes are also examined. Various modes of termination are defined, and the distributions of the time to termination and the number of transitions until termination are obtained. Dissert. Abstr.

N83-10867*# Old Dominion Univ., Norfolk, Va. Dept. of Mathematics.
FITTING MULTIDIMENSIONAL SPLINES USING STATISTICAL VARIABLE SELECTION TECHNIQUES Final Report, period ending 18 Oct. 1982
Patricia L. Smith Oct. 1982 88 p refs
(Grant NAG1-223)
(NASA-CR-169363; NAS 1.26:169363) Avail: NTIS HC A05/MF A01 CSCL 12A

This report demonstrates the successful application of statistical variable selection techniques to fit splines. Major emphasis is given to knot selection, but order determination is also discussed. Two FORTRAN backward elimination programs using the B-spline basis were developed, and the one for knot elimination is compared in detail with two other spline-fitting methods and several statistical software packages. An example is also given for the two-variable case using a tensor product basis, with a theoretical discussion of the difficulties of their use. Author

N83-10868 American Univ., Washington, D. C.
A PRINCIPAL COMPONENTS APPROACH TO SOME MULTIVARIATE ESTIMATION PROBLEMS WITH INCOMPLETE DATA Ph.D. Thesis
Syros Christoforou Asproudis 1981 85 p
Avail: Univ. Microfilms Order No. DA8204555

The maximum likelihood estimators of the parameters of a multivariate normal distribution based on nonotone samples and their first two moments were derived in the literature. When multicollinearity is present, these estimators are unreliable. By using a subset of the sample covariance matrix's prinicpal components, estimators free of the distortions caused by multicollinearity are constructed. The estimators are shown to be consistent and asymptotically unbiased. The distributions of various functions of the sample covariance matrix pertaining to those estimators are derived and closed form expressions for he first two moments of the estimators based on principal components are obtained. The multivariate regression problem in monotone samples is also examined. When there is no indication of multicollinearity, a set of estimators for the regression parameters are proposed which are shown to be consistent, asymptotically unbiased and to have smaller variances than the usual least squares regression estimators. The technique is extended in monotone multicollinear samples. Dissert. Abstr.

N83-10869# California Univ., Livermore. Lawrence Livermore Lab. Engineering Research Div.
STOP: A FAST PROCEDURE FOR THE EXACT COMPUTATION OF THE PERFORMANCE OF COMPLEX PROBABILISTIC SYSTEMS
G. C. Corynen Jan. 1982 13 p refs
(Contract W-7405-eng-48)
(DE82-007990; UCRL-53230) Avail: NTIS HC A02/MF A01

A new set-theoretic method for the exact and efficient computation of the probabilistic performance of complex systems is discussed. The core of the method is a fast algorithm for disjointing a collection of product sets which is intended for systems with more than 1000 components and 100,000 cut sets. The method is based on a divide-and-conquer approach, in which a multidimensional problem is progressively decomposed into lower-dimensional subproblems along its dimensions. The method also uses a particular pointer system that eliminates the need to store the subproblems by only requiring the storage of pointers to those problems. Examples of the algorithm and the divide-and-conquer strategy are provided, and comparisons with other significant methods are made. Statistical complexity studies show that the expected time and space complexity of other methods is O(me/sup n/), but that our method is O(nm(3) log(m)). Problems which would require days of Cray-1 computer time with present methods can now be solved in seconds. Large-scale systems that can only be approximated with other techniques can now also be evaluated exactly. DOE

N83-10870# Florida State Univ., Tallahassee. Dept. of Statistics.
LARGE DEVIATION LOCAL LIMIT THEOREMS FOR ARBITRARY SEQUENCES OF RANDOM VARIABLES
Narasinga Rao Chaganty and J. Sethuraman Jun. 1982 39 p refs
(Contract DAAG29-79-C-0158)
(AD-A117513; FSU-STATISTICS-M630; TR-D-53;
ARO-16713.19-MA) Avail: NTIS HC A03/MF A01 CSCL 12/1

The results of W. Richter (Theory Prob. Appl. (1957) 2 206-219) on sums of independent, identically distributed random variables are generalized to arbitrary sequences of random variables Tn. Under simple conditions on the cumulant generating function of Tn, which imply that Tau n/n converges to o, it is shown, for arbitrary sequences (mn) converging to o, that kn(mn), the probability density function of Tn/n at mn, is asymptotic to an expression involving the large deviation rate of Tn/n. Analogous results for lattice random variables are also given. Applications of these results to statistics appearing in nonparametric inference are presented. Author (GRA)

N83-10871# Princeton Univ., N. J. Dept. of Statistics.
THE THEORY OF CONCENTRATED FISHER-VON-MISES DISTRIBUTIONS
Geoffrey S. Watson Sep. 1981 28 p refs
(Contract N00014-79-C-0322)
(AD-A117514; TR-205-SER-2) Avail: NTIS HC A03/MF A01 CSCL 12/1

The density of the Fisher-von-Mises distribution is proportional to exp kappa micron prime x where x and the modal vector microns are unit vectors in IR(q) times kappa (equal to or greater than 0) is called the concentration parameter. The distribution of statistics for testing hypotheses about the modal vectors of m distributions simplify greatly as the concentration parameters tend to infinity. The non-null distributions are obtained for statistics appropriate when kappa 1,..., kappa m are known but tend to infinity and are unknown but equal to kappa which tends to infinity. GRA

N83-10872# Princeton Univ., N. J. Dept. of Statistics.
LARGE SAMPLE THEORY OF THE FISHER-VON-MISES DISTRIBUTION
Geoffrey S. Watson Sep. 1981 34 p refs
(Contract N00014-79-C-0322)
(AD-A117515; TR-203-SER-2) Avail: NTIS HC A03/MF A01 CSCL 12/1

The Fisher-von-Mises distribution has probability density proportional to exp kappa micron prime x where x and microns are points on the surface of the unit ball in q dimensions. Kappa greater than or equal to 0 is a concentration parameter and micron the 'mean' or modal direction. This paper makes a self-contained study of estimation and testing problems when the sample sizes are large. Earlier work used approximations based on eta finite and kappa large. Some of these results are shown to be true for all kappa if eta yields infinity. New tests are given by comparing the kappa's and the micron's of different populations; the latter tests do not assume that all populations have the same kappa's. Further, power functions are given for the proposed tests. Because the random vectors are of unit length we may expect these asymptotic distributions to be accurate approximations even with quite small sample sizes. Author (GRA)

N83-10873# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.

IDENTIFICATION OF MULTIVARIATE LINEAR SYSTEMS
James M. Griffith Apr. 1982 63 p refs
(Contract DE-AC07-76ID-01570)
(DE82-015201; EGG-FE-5842) Avail: NTIS HC A04/MF A01

Multivariate identification problems are treated with a least squares approach. The classical parameter-estimate bias problem caused by measurement noise is considered and a straightforward and effective way to removeal method is generalized and a form selection procedure developed. The form selection procedure generally ensures more accurate identification than is possible with identification methods which rely on a fixed form. The concept of a form selection procedure is introduced. Four example problems are presented. Each example illustrates specific features of the identification technique. As a collection the examples emphasize the complexity of system identification and demonstrate that identification techniques will perform well when carefully applied. DOE

N83-10874# Centre National de la Recherche Scientifique, Marseilles (France). Centre de Physique Theorique.
GEOMETRICAL REMARKS IN STATISTICAL MECHANICS. 1: THE DUALITY TRANSFORMATION ON A LATTICE WITH AN ABELIAN GROUP AS CONFIGURATION SPACE
A. Messager Dec. 1980 24 p refs
(DE82-903181; CNRS-CPT-79/P.1081-Rev) Avail: NTIS HC A02/MF A01

It is shown that the duality transformation in statistical mechanics which connects high and low temperature regime is the usual x-operation in differential geometry (a simple example of which is the correspndence between equipotentials and streamlines). This fact is interpreted for phase transition problems. DOE

66 SYSTEMS ANALYSIS

Includes mathematical modeling; network analysis; and operations research.

N83-10875# Comptroller General of the United States, Washington, D.C.
DOD'S USE OF REMOTELY PILOTED VEHICLE TECHNOLOGY OFFERS OPPORTUNITIES FOR SAVING LIVES AND DOLLARS Report to the Congress
3 Apr. 1981 43 p
(MASAD-81-20; B-202379) Avail: NTIS HC A03/MF A01

The status of remotely piloted vehicle technology, reasons for its limited application by the Department of Defense, and the potential for applying this technology to nonmilitary uses are discussed. Recommendations are given. R.J.F.

N83-10876*# National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
NONLINEAR OPTIMIZATION WITH LINEAR CONSTRAINTS USING A PROJECTION METHOD
Thomas Fox Sep. 1982 99 p refs
(NASA-TP-2086; M-389; NAS 1.60:2086) Avail: NTIS HC A05/MF A01 CSCL 12B

Nonlinear optimization problems that are encountered in science and industry are examined. A method of projecting the gradient vector onto a set of linear contraints is developed, and a program that uses this method is presented. The algorithm that generates this projection matrix is based on the Gram-Schmidt method and overcomes some of the objections to the Rosen projection method. M.G.

N83-10877# Council for Scientific and Industrial Research, Pretoria (South Africa). National Inst. for Aeronautics and Systems Technology.
COMPARATIVE SYSTEM MODEL VALIDATION USING FOUR OPTIMIZATION ALGORITHMS
A. F. Engelbrecht Dec. 1981 35 p refs
(NIAST-81/124) Avail: NTIS HC A03/MF A01

Experience in use of identification programs is described. The Newton, Gray, Levenberg, and Chapman-Kirk techniques are applied to validating analytic models of several physical systems. Author

67 THEORETICAL MATHEMATICS

Includes topology and number theory.

N83-10878# Sandia Labs., Albuquerque, N. Mex. Numerical Mathematics Div.
CONDITIONING OF MATRICES ARISING IN THE SOLUTION OF STIFF ODES
Lawrence F. Shampine May 1982 14 p refs
(Contract DE-AC04-76DP-00789)
(DE82-017641; SAND-82-0906) Avail: NTIS HC A02/MF A01

In the numerical solution of the initial value problem for a system on N ordinary differential equatons (ODEs) y' = f (X,Y), a less than or equal to x less than or equal to b, Y(a) given, it is necessary to distinguish a kind of behavior called stiff. A variety of numerical procedures are known for coping with the difficulties of stiffness. They all involve the solution of linear systems with matrix of the form I - h(BETA)J where J is the Jacobian matrix of partial derivatives of the function f and (BETA) is a constant characteristic of the procedure. The step size h is selected by the code so that in proceeding from an approximation y/sub n/ to y(x/sub n/) to one at x/sub n + 1/ = x/sub n/ + h, the new approximation Y/sub n + 1/ will agree with y(x/sub n + 1/) to a specified accuracy. DOE

70 PHYSICS (GENERAL)

For geophysics see *46 Geophysics*. For astrophysics see *90 Astrophysics*. For solar physics see *92 Solar physics*.

N83-10879# California Univ., Livermore. Lawrence Livermore Lab.
STABILITY AND DISTURBANCE OF LARGE dc SUPERCONDUCTING MAGNETS
S. T. Wang 1981 15 p refs Submitted for publication
(Contract W-7405-eng-48)
(DE82-012388; UCRL-86890-Rev-1) Avail: NTIS HC A02/MF A01

The stability aspects of several successful dc superconducting magnets are addressed. The 12 foot bubble chamber magnets, the 15 foot bubble chamber magnets, the MFTF-Bmagnet systems, the U-25B bypass MHD magnet, and the CFFF Superconducting MHD magnet are examined. All of these magnets are cooled in pool boiling mode. Magnet design is reviewed and the adopted stability criteria, analyses of stability and disturbance, stability simulation, and the final results of magnet performance and the observed coil disturbances are discussed. DOE

N83-10880# Cornell Univ., Ithaca, N. Y. Dept. of Theoretical and Applied Mechanics.
MAGNETOELASTIC INSTABILITIES AND VIBRATIONS OF SUPERCONDUCTING-MAGNET SYSTEMS Final Summary Report, Sep. 1975 - May 1979
Francis C. Moon Mar. 1982 40 p refs
(Contracts DE-AS02-76ET-52042; DE-AC02-76ET-52042; EY-76-S-02-2780; Grant NSF ENG-76-23527)
(DE82-015206; DOE/ET-52042/5; COO-2780/5) Avail: NTIS HC A03/MF A01

The structural design of superconducting magnets for magnetic fusion reactors was studied. Magnetomechanical instabilities in toroidal and poloidal field magnets for proposed fusion reactors were investigated. One major accomplishment was the building and testing of a 1/75th scale superconducting structural model of a 16 coil Tokamak reactor. The buckling of toroidal and poloidal field coils under different constraints was observed. The effect of currents on natural frequencies, poloidal-toroidal coil interaction,

and buckling induced superconducting normal quench of the coils were studied. The stability of poloidal coil in a toroidal magnet field were investigated with the 16 coil torus. A superconducting poloidal coil becomes statistically unstable or buckle as the current approaches a certain value. Magnetoelastic buckling of other magnet systems such as a yin-yang pair of magnets, Ioffe coils, and discrete coil solenoids are also studied. DOE

N83-10881# Texas Univ., Austin. Inst. for Fusion Studies.
VACUUM MAGNETIC FIELDS WITH DENSE FLUX SURFACES
John R. Cary May 1982 16 p refs
(Contract DE-FG05-80ET-53088)
(DE82-014989; IFSR-55) Avail: NTIS HC A02/MF A01

A procedure for eliminating resonances and stochasticity in nonaxisymmetric vacuum toroidal magnetic field is presented. The procedure is tested by the surface of section method. It is found that magnetic fields with increased rotational transform and decreased island structure can be obtained while retaining basically the same winding law. DOE

71 ACOUSTICS

Includes sound generation, transmission and attenuation. For noise pollution see *45 Environment Pollution.*

N83-10882# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
NONLINEAR SCATTERING OF ULTRASOUND BY BUBBLES: NUMERICAL AND EXPERIMENTAL INVESTIGATIONS WITH APPLICATION TO THEIR DETECTION Ph.D. Thesis
Brian Clare Eatock Feb. 1982 99 p
(UTIAS-261; ISSN-0082-5255) Copyright. Avail: Issuing Activity

The magnitude of the nonlinear effect in the scattering of ultrasound by nitrogen bubbles in water is examined for ultrasonic frequencies and amplitudes typical of those used in diagnostic medical instruments. The research is directed towards determining whether this effect could be used to detect bubbles in blood or tissue, for application in decompression research. The theory of bubble dynamics is reviewed. Numerical solutions of the modified Rayleigh equation, including the effects of acoustic, thermal, and viscous damping, and the dependence of the polytropic gas constant on frequency, are presented. A system for the spectral analysis of a single ultrasonic pulse, scattered by bubbles, is described, and the results of experiments, intended to complement the numerical investigations, are reported. For conditions typical of diagnostic ultrasound, it is shown that nonlinear scattering is significant (second harmonic greater than -40 dB with respect to the fundamental) only for the population of bubbles which are close to, or smaller than, the resonance size, for the ultrasonic frequency in use. Therefore, the use of nonlinear scattering for the detection of bubbles is limited to cases where the ultrasonic frequency is close to the resonance frequency of the bubbles, or requires variation of the ultrasonic frequency. Author

N83-10883*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
FLIGHT EFFECTS OF FAN NOISE
David Chestnutt, ed. Sep. 1982 128 p refs Presented at the Workshop on Res. on the Simulation of In-Flight Fan Noise and Flight Effects, Hampton, Va., 26-27 Jan. 1982
(NASA-CP-2242; L-15493; NAS 1.55:2242) Avail: NTIS HC A07/MF A01 CSCL 20A

Simulation of inflight fan noise and flight effects was discussed. The status of the overall program on the flight effects of fan noise was reviewed, and flight to static noise comparisons with the JT15D engine were displayed. S.L.

N83-10884 Arizona Univ., Tucson.
ULTRASOUND SPECTROSCOPY Ph.D. Thesis
Clyde Lee Giles 1981 136 p
Avail: Univ. Microfilms Order No. DA820736

An ultrasound spectrometer was designed, constructed and used to measure the frequency dependence of forward scattered ultrasound from biological specimens. A piezoelectric transducer was continuously tuned through the frequency range of 150 to 400 MHz, producing ultrasound of the same frequency. Pulse modulation of the input signal permitted a frequency resolution of 2 MHz. The received pulse was detected at various temporal positions of its amplitude, thereby allowing measurement of the interference of the scattered and unscattered ultrasound radiation. Because of system nonlinearities all received signals were calibrated with respect to the attenuation of ultrasound in water over the system frequency range. The attenuation of water over the frequency range of 150 to 400 MHz was measured. Forward scattering experiments were performed with both physical objects and biological specimens. Sapphire spheres and plastic cylinders exhibited the expected Mie scattering resonant structure.
Dissert. Abstr.

N83-10885*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
UTILIZING NUMERICAL TECHNIQUES IN TURBOFAN INLET ACOUSTIC SUPPRESSOR DESIGN
Kenneth J. Baumeister 1982 23 p refs Presented at the 19th Ann. Meeting of the Soc. of Eng. Sci., Rolla, Mo., 27-29 Oct. 1982
(NASA-TM-82994; E-1427; NAS 1.15:82994) Avail: NTIS HC A02/MF A01 CSCL 20A

Numerical theories in conjunction with previously published analytical results are used to augment current analytical theories in the acoustic design of a turbofan inlet nacelle. In particular, a finite element-integral theory is used to study the effect of the inlet lip radius on the far field radiation pattern and to determine the optimum impedance in an actual engine environment. For some single mode JT15D data, the numerical theory and experiment are found to be in a good agreement. Author

N83-10886# Pennsylvania State Univ., University Park. Applied Research Lab.
INVESTIGATION INTO BIAS ERRORS OF THE TWO-MICROPHONE CROSS-SPECTRAL METHOD TO MEASURE ACOUSTIC INTENSITY M.S. Thesis
Paul D. Kiteck 2 Jun. 1982 163 p refs
(Contract N00024-79-C-6043)
(AD-A117767; ARL/PSU/TM-82-135) Avail: NTIS HC A08/MF A01 CSCL 09/1

The practical application of the two-microphone cross-spectral method of measuring acoustic intensity has recently gained great popularity in the field of noise control and soon will become the standard method of measuring the sound power of a noise source in-situ. The cross-spectral intensity technique contains inherent limitations which must be thoroughly understood before applying the measuring method in the field. These errors of the cross-spectral intensity method can be classified in terms of both bias and random errors, and if the coherence between the two receivers approaches unity and the random errors are sufficiently reduced by an appropriate amount of averaging by the FFT analyzer, the bias errors are then considered to be the major contributor to the deficiencies of the two-microphone intensity technique. These bias errors of the cross-spectral intensity technique have been theoretically analyzed in the literature but not completely verified experimentally. Therefore, the purpose of this work is to experimentally investigate the bias errors of the cross-spectral method of measuring acoustic intensity and also provide a current review of the technique. Author (GRA)

N83-10887# Rocketdyne, Canoga Park, Calif. Energy System Group.
ACOUSTIC-EMISSION MONITORING OF STEAM TURBINES Final Report
L. J. Graham, R. L. Randall, and C. Hong Apr. 1982 115 p refs
(EPRI Proj. 1266-14)
(DE82-904663; EPRI-CS-2367) Avail: NTIS HC A06/MF A01

A method for the on-line detection of crack growth in steam

turbine rotors based on acoustic emission (AE) monitoring is discussed. A systematic study involving a number of tasks was performed to evaluate the potential for the detection and correct identification of crack growth AE signals during various turbine operating conditions. These included acoustic wave propagation and attenuation measurements, background noise characterization, laboratory rotor material tests, monitoring equipment optimization, dynamic stress analysis of the rotor under transient operation and on-line source location and signal characterization. No crack growth was detected during the monitoring periods but there was sufficient information from the combined tasks to estimate the flaw growth detectability during different operating conditions if it occurs. The experience also suggests that AE monitoring can be useful for diagnosis of other turbine problems such as blade rubbing, out-of-balance condition, bearing deterioration, lubricating oil contamination and perhaps boiler exfoliation and blade erosion. DOE

N83-10888# National Aerospace Lab., Amsterdam (Netherlands). Fluid Dynamics Div.
A SMALL STROUHAL NUMBER ANALYSIS FOR ACOUSTIC WAVE - JET FLOW PIPE INTERACTION
S. W. Rienstra 26 Feb. 1980 37 p refs Revised Submitted for publication
(NLR-MP-80011-U) Avail: NTIS HC A03/MF A01

Asymptotic expansions for small Strouhal number, valid for arbitrary subsonic Mach number, based on an exact formal solution were derived. The expansions concern pressure and velocity fluctuations in the jet flow and in the far field, and the reflection coefficient, end-impedance and end-correction for the reflected wave in the pipe. The influence of a Kutta condition at the lip of the pipe is shown to be highly significant. Author (ESA)

N83-10435# Columbia Univ., New York. Inst. of Flight Structures.
RECENT RESEARCH ON NOISE TRANSMISSION INTO AIRCRAFT
R. Vaicaitis *In* Shock and Vibration Information Center The Shock and Vibration Dig., Vol. 14, No. 8 Aug. 1982 p 13-18 refs (For primary document see N83-10433 01-39)
Avail: SVIC, Code 5804, Naval Research Lab., Washington, D.C. 20375 CSCL 20/1

N83-10230# Naval Research Lab., Washington, D. C.
SOUND PROPAGATION THROUGH LIQUIDS IN VISCOELASTIC CIRCULAR CYLINDERS
Richard A. Skop *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 1 May 1981 p 217-222 refs (For primary document see N83-10216 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/1

N83-10235# Pacific Missile Test Center, Point Mugu, Calif.
PARAMETERS FOR DESIGN OF REVERBERANT ACOUSTIC CHAMBERS FOR TESTING AIR-CARRIED MISSILES
T. W. Elliott *In* Shock and Vibration Information Center Shock and Vibration Bull., Pt. 2 May 1982 p 31-39 refs (For primary document see N83-10231 01-31)
Avail: NTIS HC A11/MF A01 CSCL 20/1

N83-10272# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
ACOUSTIC ENVIRONMENT ON THE SURFACE OF A LARGE-SCALE POWERED MODEL OF A VECTORED-ENGINE-OVER-THE-WING STOL CONFIGURATION
L. L. Shaw and S. Y. Lee *In* Shock and Vibration Information Center The Shock and Vibration Bull., Pt. 3 May 1981 p 225-235 refs (For primary document see N83-10253 01-31)
Avail: NTIS HC A12/MF A01 CSCL 20/1

72 ATOMIC AND MOLECULAR PHYSICS

Includes atomic structure and molecular spectra.

N83-10889# Sandia Labs., Albuquerque, N. Mex.
RESPONSE OF HEAVILY SHIELDED PLASTIC SCINTILLATOR: PHOTOMULTIPLIER COMBINATIONS TO NANOSECOND NEUTRON PULSES
R. J. Leeper and J. Chang 1981 4 p refs
(Contract DE-AC04-76DP-00789)
(DE82-001096; SAND-81-1084C; CONF-811102-7) Avail: NTIS HC A02/MF A01

The effect of neutron transport in massive shields surrounding scintillation detectors was experimentally determined. Beam target prompt neutron production to measure ion beam current, and the measurement of thermonuclear neutron production in particle beam fusion experiments nanosecond measurements from scintillator photomultiplier combinations shielded with massive amounts of lead. The lead shield is necessary to attenuate the intense X-ray bursts characteristic of these experiments. The response, of shielded detectors to several nanosecond wide neutron pulses was established for both 2.45 MeV and 14.1 MeV neutrons. The characteristic neutron pulse shape measured for lead shields up to 20.3 cm in thickness show a sharp leading edge with a few nanoseconds risetime, a FWHM of 5 to 10 ns, and a tail that can extend an analysis of elastic, inelastic, and (n, 2n) reactions that occur in the lead shield. DOE

N83-10890# Sandia Labs., Albuquerque, N. Mex. Theoretical Div.
ELECTRON BREMSSTRAHLUNG ANGULAR-DISTRIBUTION FITS FOR ATOMIC NUMBERS 1 OR = TO Z OR = TO 92 AND INCIDENT-ELECTRON ENERGIES 1 keV OR = TO T OR = TO 500 keV
Lynn Kissel Jan. 1982 73 p refs
(Contract DE-AC04-76DP-00789)
(DE82-013388; SAND-81-2154) Avail: NTIS HC A04/MF A01

The analytic fit of a simple expression to the electron bremsstrahlung angular distribution cross section d(2)sigma/dkd (LAMBDA) (differential in the emitted photon energy k and angle (LAMBDA) is investigated. Optimal choices for the fit parameters are determined and fit coefficients are tabulated for a large number of neutral-atom cases. Results are also presented for fits to the relativistic Coulomb-Born approximation. Comparisons between the screened neutral-atom results and the Coulomb-Born results are made. Discrepancies reported to exist between angular distribution cross sections and fit coefficients published by Tseng, Pratt and Lee are confirmed and understood in terms of their choice of fit weight function. DOE

N83-10891# Tennessee Univ., Knoxville.
EXPERIMENTS ON CONTINUUM ELECTRON CAPTURE IN ATOMIC HYDROGEN AND COLLISIONAL INTERACTIONS OF TRAPPED IONS
Mar. 1982 25 p refs
(Contract DE-AS05-79ER-10512)
(DE82-013939; DOE/ER-10512/3) Avail: NTIS HC A02/MF A01

The background, scope, and progress made on: (1) experiments designed to test the present theory of charge exchange to continuum for the case of bare nuclei traversing atomic hydrogen targets, and (2) experiments designed to measure charge exchange reaction rates for less than or equal to 10 eV multiply charged ions in neutral gas targets are described. Also, progress on the development of a hydrogen gas target is detailed. DOE

N83-10892# California Univ., Berkeley. Lawrence Berkeley Lab. Materials and Molecular Research Div.
PHOTOELECTRON SPECTROSCOPY OF SUPERSONIC MOLECULAR BEAMS Ph.D. Thesis
James Edward Pollard May 1982 175 p refs
(Contract DE-AC03-76SP-00098)
(DE82-016940; LBL-14285) Avail: NTIS HC A08/MF A01

A technique for performing high resolution molecular photoelectron spectroscopy includes the introduction of the sample in the form of a collimated supersonic molecular beam; and the use of an electrostatic deflection energy analyzer which is carefully optimized in terms of sensitivity and resolution. This combination

makes it possible to obtain photoelectron spectra at a new level of detail for many small molecules. Three experiments described which rely on the capability to perform rotationally-resolved photoelectron spectroscopy on the hydrogen molecule and its isotopes include: (1) measurement of the ionic vibrational and rotational spectroscopic constants and the vibrationally-selected photoionization cross sections; (2) determination of the photoelectron asymmetry parameter, (ALPHA), for selected rotational transitions; and (3) investigation of the rotational relaxation in a free jet expansion, using photoelectron spectroscopy as a probe of the rotational state population distributions. Successes and limitations of the technique are assessed and areas for further improvement in future spectrometers are indicated. DOE

N83-10893# Los Alamos Scientific Lab., N. Mex.
NUMERICAL CALCULATION OF THE THOMAS-FERMI-VON WEIZSACKER FUNCTION FOR AN INFINITE ATOM WITHOUT ELECTRON REPULSION
Elliott H. Lieb and David A. Liberman Apr. 1982 25 p refs
(Contract W-7405-eng-36)
(DE82-014123; LA-9186-MS) Avail: NTIS HC A02/MF A01

The Thomas-Fermi (TF) and Thomas-Fermi-von Weizsacker (TFW) theories of atoms and molecules with electron-electron repulsion are reviewed. The main difference between the energies, E(TFW) - E(TF) (for large z), is a term D(TFW) z(2). (It is also believed that E(Q) - E(TF) approx. D(Q)z(2), where E(Q) is the true quantum ground state energy). To calculated D(TFW), it is necessary to find the positive solution to the differential equation. While this equation arises from TFW theory with electron-electron repulsion, it also has a second interpretation - namely as the TFW equation for an atom without electron-electron repulsion. The numerical solution of this equation and the evaluation of D(TFW) is emphasized. DOE

N83-10894# Sandia Labs., Albuquerque, N. Mex.
HIGH-POWERED PULSED-ION-BEAM ACCELERATION AND TRANSPORT
Stanley Humphries, Jr. and Thomas R. Lockner Nov. 1981 129 p refs
(Contract DE-AC04-76DP-00789)
(DE82-006879; SAND-81-2009) Avail: NTIS HC A07/MF A01

Research on intense ion beam acceleration and transport is reviewed. The limitations imposed on ion beam transport by space charge effects and methods available for neutralization are summarized.The general problem of ion beam neutralization in regions free of applied electric fields and the physics of acceleration gaps are described. Experiments on multistage ion acceleration are summarized. DOE

N83-10895# California Univ., Berkeley. Lawrence Berkeley Lab.
SOME CALCULATOR PROGRAMS FOR PARTICLE PHYSICS
Charles G. Whol Jan. 1982 28 p
(Contract W-7405-eng-48)
(DE82-012362; LBL-13987) Avail: NTIS HC A03/MF A01

Seven calculator programs that do simple chores that arise in elementary particle physics are given. LEGENDRE evaluates the Legendre polynomial series. ASSOCIATED LEGENDRE evaluates the first associated Legendre polynomial series. CONFIDENCE calculates confidence levels for chi(2), Gaussian, or Poisson probability distributions. TWO BODY calculates the c.m. energy, the initial and final state c.m. momenta, and the extreme values of t and u for a two body reaction. ELLIPSE calculates coordinates of points for drawing an ellipse plot showing the kinematics of a two body reaction or decay. DALITZ RECTANGULAR calculates coordinates of points on the boundary of a rectangular Dalitz plot. DALITZ TRIANGULAR calculates coordinates of points on the boundary of a triangular Dalitz plot. There are short versions of CONFIDENCE (EVEN N and POISSON) that calculate confidence levels for the even degree of freedom chi(2) and the Poisson cases. The programs are written for the HP-97 calculator. DOE

N83-10896# Sandia Labs., Albuquerque, N. Mex. Simulation Technology Research Div.
ELECTRON ENERGY AND CHARGE ALBEDOS: CALORIMETRIC MEASUREMENT VS MONTE CARLO THEORY
Grant J. Lockwood, Laurence E. Ruggles, Glenn H. Miller, and John A. Halbleib Nov. 1981 74 p refs
(Contract DE-AC04-76DP-00789)
(DE82-006870; SAND-80-1968) Avail: NTIS HC A04/MF A01

A calorimetric method was employed to obtain saturated electron energy albedos for Be, C, Al, Ti, Mo, Ta, U, and UO2 over the range of incident energies from 0.1 MeV to 1.9 MeV. The technique was so designed to permit the simultaneous measurement of saturated charge albedos. In the cases of C, Al, Ta, and U the measurements were extended down to about 0.025 MeV. The angle of incidence was varied from 00 (normal) to 750 in steps of 150, with selected measurements at 82.50 in Be and C. In each case, predictions were obtained from a Monte Carlo model. The generally good agreement between theory and experiment over this extensive parameter space represents a strong validation of both the theoretical model and the experimental method. Nevertheless, certain discrepancies at low incident energies, especially in high atomic number materials, and at all energies in the case of the U energy albedos are not completely understood. DOE

73 NUCLEAR AND HIGH-ENERGY PHYSICS

Includes elementary and nuclear particles; and reactor theory.

For space radiation see *93 Space Radiation.*

N83-10897# Department of Energy, Washington, D. C. Office of Energy Research.
TECHNOLOGY SPIN-OFFS FROM THE MAGNETIC FUSION ENERGY PROGRAM
May 1982 167 p
(DE82-016923; DOE/ER-0132) Avail: NTIS HC A08/MF A01

A description of 138 possible spin offs from the magnetic fusion program is presented. The spin offs cover the following areas: (1) superconducting magnets, (2) materials technology, (3) vacuum systems, (4) high frequency and high power RF, (5) electronics, (6) plasma diagnostics, (7) computers, and (8) particle beams. DOE

N83-10898# Department of Energy, Washington, D. C. Office of Energy Research.
REPORT OF THE SUBPANEL ON LONG-RANGE PLANNING FOR THE US HIGH-ENERGY-PHYSICS PROGRAM OF THE HIGH-ENERGY-PHYSICS ADVISORY PANEL
Jan. 1982 69 p
(DE82-012502; DOE/ER-0128) Avail: NTIS HC A04/MF A01

To maintain vitality and preeminence over the next decade, the U.S. high energy program ingredients: (1) strong exploitation of existing facilities; (2) the expeditious completion of construction projects which will expand these facilities over the next few years; (3) the construction of a substantial facility to be ready for research by the end of the 1980's; and (4) the pursuit of a wide range of advanced acelerator R and D programs in preparation for the design and construction of a higher energy accelerator. Average yearly support levels of $440M DOE, $35M NSF, and $395M DOE, $34M NSF (FY 1982 dollars) and the impact of a yet lower support level of $360M DOE and $32M NSF wer considered. Facilities in high energy physics are described and recommendations and long range plans are discussed. Recommendations for international collaboration are included. DOE

N83-10899# Bonn Univ. (West Germany). Physikalisches Inst.
PHOTON INDUCED REACTIONS
B. A. Mecking Apr. 1982 25 p refs Presented at Conf. on New Horizons in Electromagnetic Nucl. Phys., Charlottesville, Va., Apr. 1982
(Bonn-He-82-7; ISSN-0172-8733) Avail: NTIS HC A02/MF A01

Experimental possibilities offered by the next generation of electron accelerators are discussed. These accelerators provide photon beams (mainly tagged bremsstrahlung) with high energy resolution, reasonable intensity and a precise normalization of the photon flux. This removes the main obstacles preventing the exploitation of real photons as a clean probe. Apart from technological advances, a unified theoretical description of pion and (real and virtual) photon induced reactions is necessary to disentangle the effects of the nuclear structure and the interaction mechanism. Author (ESA)

74 OPTICS

Includes light phenomena.

N83-10900* National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
MULTIPRISM COLLIMATOR Patent
Peter O. Minott, inventor (to NASA) Issued 21 Sep. 1982 7 p Filed 8 Oct. 1980 Supersedes N81-12387 (19 - 03, p 0346)
(NASA-Case-GSC-12608-1; US-Patent-4,350,410; US-Patent-Appl-SN-195228; US-Patent-Class-350-170; US-Patent-Class-350-286) Avail: US Patent and Trademark Office CSCL 20F

A special purpose optical collimator system which generates multiple collimated light beams with precisely related angular separation of the beams, is comprised of a stack of relatively flat plate-like refracted prisms in the form of wedges. Each prism has a specified angular deviation, mounted on top of one another in a fixture which holds the wedges so that they are adapted to operate at minimum angular deviation and thus are relatively insensitive to rotational and angular charges. A collimated sources of monochromatic light, generated for example by a helium-neon laser and a collimated beam expander, provides a common incident beam to the wedges whereupon a number equally spaced emergent beams are provided.
Official Gazette of the U.S. Patent and Trademark Office

N83-10901 Illinois Univ., Urbana-Champaign.
DISCHARGE PUMPED IODINE MONOFLUORIDE LASER: OPERATING PARAMETERS AND COLLISIONAL KINETICS Ph.D. Thesis
Michael Lawrence Dlabal 1981 74 p refs
Avail: Univ. Microfilms Order No. DA8203444

Lasing was observed at five different wavelengths ranging from 472 to 497 nm from discharge pumped iodine monofluoride (IF). At the optimum output coupling 4 mJ was measured in a 30 ns FWHM pulse with a peak power of 140 kW. The merits and deficiencies of both HI and CF3I as iodine donors are discussed. Measurements show the small signal gain to be $>$ or $=$ 1%/cm from 478 to 497 nm, while much of the absorption is due to excited state of He. Limited line tunability is also demonstrated by using an internally mounted Littrow prism. Quenching measurements of the upper and lowr laser level show the lower level to be removed more rapidly, thereby avoiding bottlenecking. In addition, the upper level spontaneous emission lifetime is measured to 17.2 + or - 4.0 ns. Finally studies of the formation kinetics of the upper laser level of IF show I (4P) atoms to be an immediate precursor, while the F (4P) atoms are unimportant. Dissert. Abstr.

N83-10902 California Inst. of Tech., Pasadena.
THE LUMINESCENT SOLAR CONCENTRATOR Ph.D. Thesis
John Samuel Batchelder 1982 286 p
Avail: Univ. Microfilms Order No. DA820334

The luminescent solar concentrator (LSC) allows sunlight to be concentrated through the use of light pipe trapping of luminescence. Such concentrators do not require tracking, and they can reduce the cost of solar energy conversion by reducing the required area of photovoltaic cells. The spectral characteristics of 18 organic laser dyes are studied for their applicability as luminescing centers. The spectral homogeneity and self absorption characteristics of representative dyes are examined. The relative spectral homogeneity of such dyes is shown to depend upon the surrounding material using narrow band laser excitation. Three independent techniques for measuring self absorption rates are developed; these are time resolved emission, steady state polarization anisotropy, and spectral convolution. Prototype devices are tested for performance, and the component dyes are tested for stability to solar exposure. Dissert. Abstr.

N83-10903*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
PRELIMINARY SUBMILLIMETER SPECTROSCOPIC MEASUREMENTS USING A SUBMILLIMETER HETERODYNE RADIOMETER
Harvey G. Safren, William R. Stabnow, Jack L. Bufton, Charles J. Peruso, Calvin E. Rossey, and Harold E. Walker Sep. 1982 60 p refs
(NASA-TM-83964; NAS 1.15:83964) Avail: NTIS HC A04/MF A01 CSCL 20F

A submillimeter heterodyne radiometer uses a submillimeter laser, pumped by a CO2 laser, as a local oscillator and a room temperature Schottky barrier diode as the first IF mixer. The radiometer can resolve spectral lines in the submillimeter region of the spectrum (arising from pure rotational molecular transitions) to within 0.3 MHz, using acousto-optic spectrum analyzer which measures the power spectrum by simultaneously sampling 0.3 MHz wide channels over a 100 MHz bandwidth spanning the line. Preliminary observations of eight spectral lines of H2O2, CO, NH3 and H2O, all lying in the 434-524 micrometer wavelength range are described. All eight lines were observed using two local oscillator frequencies obtained by operating the submillimeter laser with either methyl fluoride (CH3F) or formic acid (HCOOH) as the lasing gas. Sample calculations of line parameters from the observed data show good agreement with established values. One development goal is the size and weight reduction of the package to make it suitable for balloon or shuttle experiments to detect trace gases in the upper atmosphere. A.R.H.

N83-10904# City Coll. of the City Univ. of New York. Dept. of Electrical Engineering.
ACQUISITION, IMAGE AND DATA COMPRESSION Annual Technical Report, 1 Mar. 1981 - 28 Feb. 1982
Donald L. Schilling and George Eichmann 30 Apr. 1982 97 p refs
(Grant AF-AFOSR-0169-81; AF Proj. 2305)
(AD-A117737; AFOSR-82-0567TR) Avail: NTIS HC A06/MF A01 CSCL 17/2

This report discusses the following subjects: A new reservation-based multiple access packet switching technique applicable to packet communications using a satellite channel is proposed. The objective of this research is to optimize the system performance in terms of throughput and delay and to develop analytical models to analyze the scheme. Author (GRA)

N83-10905# University of Southern California, Los Angeles. Center for Laser Studies.
***STUDIES OF BISTABLE OPTICAL DEVICES* Final Report, Sep. 1978 - Jan. 1982**
Elsa Garmire 15 May 1982 83 p
(Grant AF-AFOSR-3686-78; AF Proj. 2305)
(AD-A117755; AFOSR-82-0572TR) Avail: NTIS HC A05/MF A01 CSCL 09/2

This report outlines the results of a three-and-a-half year research program in Optical Bistability and its applications for Optical Signal and Image processing. The results of the program are in four areas: (1) Study of image processing in the ultra-thin nonlinear Fabry-Perot, and demonstration (theoretically) that parallel processing of more than 1,000,000 bits in 10 to the -9th power seconds is feasible with current technology. This is an overall bit rate of 10 to the 15th power per second, using bistability in Insb; (2) Study of hybrid electro-optic bistable devices for array processing, and development of a concept to simultaneously process over 2500 parallel bits in a nanosecond, in a linear array;

(3) Studies of bistability in new materials and new geometries. This includes saturable absorbers, InAs, distributed feedback and four-wave mixing; and (4) Studies of dynamic effects in optical bistability, including critical slowing down, pulse shaping, overshoot switching, alternate switching risetime detection, pulse detection, and self-oscillation. Author (GRA)

N83-10906# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
PHASE CONJUGATE OPTICS AND ITS POTENTIAL APPLICATIONS
Wu Cunkai and Fan Junyin 7 Jun. 1982 18 p refs Transl. into ENGLISH from Laser J. (China), v. 8, no. 9, Sep. 1981 p 42-47 (AD-A117468; FTD-ID(RS)T-0469-82) Avail: NTIS HC A02/MF A01 CSCL 20/6

The principles, prospects, and potential applications of phase conjugate optics, in particular degenerate four wave mixing, are reviewed. Author (GRA)

N83-10907# Los Alamos Scientific Lab., N. Mex.
PROPOSAL TO DEVELOP TECHNIQUES USING MAGNETO-OPTIC AND ELECTRO-OPTIC EFFECTS IN OPTICAL FIBER FOR CTR DIAGNOSTICS
G. I. Chandler and F. C. Jahoda Feb. 1982 22 p refs
(Contract W-7405-eng-36)
(DE82-009548; LA-9049-MS) Avail: NTIS HC A02/MF A01

The development technology of measuring electric and magnetic fields with optical fibers using the Faraday and Kerr effects, magnetostriction, and Sagnac interferometry is discussed. The measurement of induced birefringence in the presence of natural birefringence is discussed. The use of these effects in making measurements in the fusion research program is proposed. DOE

N83-10908# General Atomic Co., San Diego, Calif.
THE DOUBLET III THOMSON-SCATTERING-SYSTEM HEMICONCENTRIC TRIPLET LENS
D. Vaslow Dec. 1981 35 p refs
(Contract DE-AT03-76ET-51011; Gen. Atomic Proj. 3344)
(DE82-017384; GA-A-16738) Avail: NTIS HC A03/MF A01

The D-III Thomson Profile System Hemiconcentric Triplet lens is described. This objective lens is used to image a 120 cm long segment of a focused TEM00 ruby laser beam onto a curved image plane where the light is collected by fiber optic bundles. The small ports on the D-III Tokamak make it necessary to situate the objective lens aperture near the front of the lens, and to funnel the light through the narrow port opening. The hemiconcentric triplet lens aperture is located at its front surface and the refraction at this surface acts to funnel the light resulting in excellent light collection at the expense of reduced off axis resolution due to astigmatism. At the edge of the field of view the worst case resolution along the laser beam is about 3 cm. The excellent correction of spherical and chromatic aberrations of this lens, however, result in minimal additional width of the light collection fiber optic bundles transverse to the beam image. DOE

N83-10909# National Bureau of Standards, Washington, D.C.
STANDARD REFERENCE MATERIALS: PREPARATION AND CALIBRATION OF FIRST SURFACE ALUMINUM MIRROR SPECULAR REFLECTANCE STANDARDS Final Report
Victor R. Weidner and Jack J. Hsia May 1982 29 p refs
(PB82-221367; NBS-SP-260-75; LC-82-600542) Avail: NTIS HC A03/MF A01 CSCL 14B

A number of first-surface aluminum mirrors of high optical quality were prepared and calibrated for use as specular reflectance standards over the wavelength range 250 to 2500 nm. The specular reflectance calibrations are provided at 25 selected wavelenghs, including the laser wavelengths of 632.8 nm and 1060 nm. These mirrors are approximately 50 mm in diameter. The aluminum coating is vacuum deposited on a 9.5 mm thick glass substrate. The mirrors were aged for two years before calibrating. The absolute reflectances of these mirrors were determined by direct comparison to the master first-surface aluminum mirror. The calibration of the master mirror was accomplished by extensive measurements, using the National Bureau of Standards reference specular reflectometer-spectrophotometer. The absolute techniques for measuring specular reflectance by means of this instrument include analysis of the reflectance of the mirror as a function of wavelength, polarization, and angle of incidence. The measurements obtained through these techniques are uncertain by + or - 0.2%. The calibration of the standard reference material mirrors was accomplished by direct comparison with the master mirror, using a commercial spectrophotometer. The uncertainty in the values of reflectance obtained by this comparative method calibration is + or - 0.5%. M.G.

N83-11016# California Univ., Livermore. Lawrence Livermore Lab.
MEASURING THE MICROTOPOGRAPHY OF OPTICAL SURFACES
G. M. Sanger *In its* Energy and Technol. Rev., Mar. 1980 Mar. 1982 p 1-8 refs (For primary document see N83-11015 01-99)
Avail: NTIS HC A03/MF A01

75 PLASMA PHYSICS

Includes magnetohydrodynamics and plasma fusion.
For ionospheric plasmas see *46 Geophysics*. For space plasmas see *90 Astrophysics*.

N83-10910 *Columbia Univ., New York.*
PRODUCTION AND EXPERIMENTAL STUDY OF THE DISSIPATIVE TRAPPED ION INSTABILITY Ph.D. Thesis
John Thomas Slough 1981 167 p
Avail: Univ. Microfilms Order No. DA8204541

A steady-linear mirror machine was constructed to simulate the collisionality regime of a magnetically confined thermonuclear plasma. The collisionality regime was attained where the detrapping collision frequency from local magnetic mirrors was much less than either the electron or ion bounce frequency in the mirror. This is also the regime where the dissipative trapped ion instability (DTII) mode is predicted to be unstable. The low collisionality was accomplished with a hydrogen plasma generated by an E II B discharge source. The mode was observed whenever the magnetic mirror was activated. The mode had the correct frequency and frequency dependence on both the magnetic field and the trapped fraction of plasma. The relative amplitude squared of the fluctuations, which were as large as 25% at low collisionality, had the same dependence on collisionality as the growth rate. The m = 1 mode which propagated azimuthally in the electron diamagnetic drift direction, was centered at the point of maximum radial density gradient and was confined axially to the magnetic mirror. The DTII mode exhibited all the basic features predicted by the basic dispersion relation derived for the linear geometry of the experiment, which, as is also shown, has great similarity to the results derived for toroidal geometries. Dissert. Abstr.

N83-10911 *California Univ., San Diego.*
KINETIC THEORY OF TEARING MODES Ph.D. Thesis
Alain Marc Sciaccaluga 1981 165 p
Avail: Univ. Micrfilms Order No. DA8203032

A kinetic model f collisionless reconnection valid in the first order of the small Larmor radius approximation was developed. The particle motion is represented by a set of action and angle variables, identified as the magnetic moment, the generalized momenta, the gyroangle and the Cartesian coordinates. The form of the Vlasov equation in this new set of canonical variables is obtained with the help of a Lie operator canonical transform. An exact expression for the electromagnetic response function is obtained by integration over characteristics. Neglecting mode coupling, in the limit of adiabatic electrons the dispersion relation is solved by n modes (the higher order modes are strongly damped) localized across the neutral plane in a region of width equal to twice the electron Larmor radius. A guiding center model of

collisionless reconnection is solved. Matching this solution with the M.H.D. solution, a dispersion relation, which is solved for a real frequency is obtained. Dissert. Abstr.

N83-10912 California Univ., Irvine.
PLASMA PHYSICS ASPECTS OF THE SOLAR NEUTRINO PROBLEM Ph.D. Thesis
Robert Olin Hunter 1981 95 p
Avail: Univ. Microfilms Order No. DA8202911

It is noted that the predicted neutrino flux rate depends upon the details of radiation transport in the interior, as well as several other factors. The conditions of the solar interior make radiation transport processes difficult to compute precisely since the plasma coupling parameter is large relative to conventional plasmas. Examination of these processes indicated that there may be substantial corrections due to many body effects. A particular process, photoionization of high Z ions, was investigated in some detail. It was postulated that the Debye shielding cloud about the ion could have dynamic fluctuations as a localized collective mode. The spectrum of these fluctuations was derived with an electron fluid model in a fashion similar to that employed for the charged liquid drop model of the nucleus. The effect on the absorption spectrum was related to the frequency transform of the propagator for the ejected electron. Finite temperature quantum field theory was applied to determine this propagator, including the coupling to the quantized charge fluctuations. A simple estimate of the results indicates that this process may not substantially alter the opacity due to the heavy elements. Dissert. Abstr.

N83-10913 Boston Coll., Chestnut Hill, Mass.
SINGULAR PERTURBATION ASPECTS OF KINETIC EQUATIONS Ph.D. Thesis
Dwight Thayer Decker 1981 150 p
Avail: Univ. Microfilms Order No. DA8203939

Singular perturbation aspects of kinetic equations are investigated by considering the kinetic theory of the electrical conductivity of a dilute electron gas for time dependent spatially uniform applied electric fields. Certain connections are made between perturbation concepts and earlier results, on the electrical conductivity of an electron gas for static spatially uniform applied electric and magnetic fields. For separable velocity dependent collision terms and time dependent applied electric fields a general technique was developed to find the distribution functions and its moments. For two time dependent electric fields this technique was applied in the case of power law collision models. The consideration of the first field, a step function where a constant field is turned on at time zero, leads to an appearance of a basic time scale. Dissert. Abstr.

N83-10914 Max-Planck-Institut fuer Plasmaphysik, Garching (West Germany).
CONSISTENT GUIDING CENTER DRIFT THEORIES
H. K. Wimmel Apr. 1982 57 p refs
(IPP-6/212) Copyright. Avail: Issuing Activity

Various guiding center drift theories that are optimized with respect to consistency are presented. They satisfy exact energy conservation theorems (in time independent fields), Liouville theorems, and appropriate power balance equations. A theoretical framework that allows direct and exact derivation of associated drift kinetic equations from the respective guiding center drift orbit theories is given. These drift kinetic equations are listed. Northrop nonoptimized theory is discussed for reference and internal consistency relations are shown. Author (ESA)

N83-10915# Tokyo Inst. of Tech. (Japan). Dept. of Energy Sciences.
STABILITY OF PROPAGATING LONG ION RING LAYER
Shigeo Kawata, Keishiro Niu, and Mitsuru Ikeda Jun. 1982 29 p refs
(IPPJ-604) Avail: NTIS HC A03/MF A01

An energy principle is developed to derive a sufficient condition for treating the low frequency stability of an axisymmetric infinitely long rotating ion layer which propagates along the axis. This kind of a long ion layer may be used as an energy driver in light ion beam inertial confinement fusion. Ion particles that carry both the axial and azimuthal currents are described in the Vlasov formalism while the motion of background plasma is approximately analyzed by using the two fluid equations. Stability boundaries are plotted in a parameter space regarding an ion layer propagating in the rarefied plasma. M.G.

N83-10916# Tokai Univ., Kanagawa (Japan). Dept. of Physics.
OBSERVATION ON STARK-SHIFTS OF LYMAN ALPHA LINES OF LOW-Z IONS IN LASER-PRODUCED PLASMAS
S. Hashimoto and N. Yamaguchi Jul. 1982 15 p refs
(IPPJ-603) Avail: NTIS HC A02/MF A01

The red shifts were observed for Lyman alpha lines of Be IV, B V, C VI, and N VII at an electron density of 5 x 10 to the 21st power cm(-3). The high density plasma ws produced by a 0.1 TW and 100 ps laser irradiation onto a plane target. The shift was measured by comparing the position of highly broadened line center with that of spatially resolved unperturbed one in a single shot photograph. The results are compared with simple theoretical estimations. M.G.

N83-10917# Nagoya Univ. (Japan). Inst. of Plasma Physics.
SAUSAGE INSTABILITY OF Z-DISCHARGED PLASMA CHANNEL IN LIB-FUSION DEVICE
S. Kawata and K. Niu Jul. 1982 20 p refs
(IPPJ-602) Avail: NTIS HC A02/MF A01

The feasibility of using current carring plasma channels for transporting intense ion beams from diodes to a target in a light ion beam fusion device is addressed. Specifically, the growth rate of the most dangerous surface mode, that is, axisymmetric sausage instability is examined for the plasma channel. The growth rate is shown to be smaller than that of the plasma channel with no fluid motion in a sharp boundary. It is concluded that the stable plasma channel can be formed. M.G.

N83-10918# Nagoya Univ. (Japan). Inst. of Plasma Physics.
MEASUREMENT OF ELECTRON CYCLOTRON EMISSION FROM JIPP T-11 PLASMA
K. Kawahata, M. Sato (Japan Atomic Energy Research Inst., Tokai), T. Tetsuka, N. Noda, and K. Sakai (Osaka Univ.) Jun. 1982 32 p refs
(IPPJ-596) Avail: NTIS HC A03/MF A01

A rapid scanning Fourier transform spectrometer was developed to measure the electron cyclotron emission from JIPP T-II plasma. The electron temperature profiles and their time evolution were obtained from the measurements of the second harmonic electron cyclotron radiation emitted perpendicular to the magnetic field. Based on the absolute calibration of the spectrometer absolute values of electron temperature are obtained independently of Thomson scattering, and its values are within the difference of 30% from those of Thomson scattering. M.G.

N83-10919# Nagoya Univ. (Japan). Inst. of Plasma Physics.
PLASMA EQUILIBRIUM AND FIELD DIFFUSION DURING CURRENT RISE PHASE OF STP-2 SCREW PINCH TOKAMAK
Akiyoshi Nagata Jun. 1982 35 p refs
(IPPJ-594) Avail: NTIS HC A03/MF A01

Plasma equilibrium and field diffusion during the current rise phase of the discharge was investigated in STP-2 screw pinch tokamak. The plasma with maximum poloidal beta value beta sub p of 3.0 was obtained by compression and joule heating. However the maximum beta sub p value without strong wall contacts was about 1.3. It was observed that force free current is formed in the periphery of the plasma and the penetration rate of the poloidal magnetic field is much faster than the penetration rate calculated from the classical resistivity. To understand the high beta plasma equilibrium and the mechanism of fast penetration rate observed in STP-2 plasmas, a numerical simulation was performed using a 2-D MHD pinch code TOPICS. It is demonstrated that the fast penetration rate can be explained by introducing the influx of neutral particles and the ion acoustic type anomalous resistivity. M.G.

N83-10920# Nagoya Univ. (Japan). Inst. of Plasma Physics.
US-JAPAN JOINT INSTITUTE FOR FUSION THEORY WORKSHOP ON NONEQUILIBRIUM STATISTICAL PHYSICS PROBLEMS IN FUSION PLASMAS: STOCHASTICITY AND CHAOS
Apr. 1982 206 p refs Workshop held in Kyoto, Japan, 9-13 Nov. 1981
(IPPJ-587) Avail: NTIS HC A10/MF A01

Recent progress in the research for magnetic confinement of high temperature plasmas has revealed several important roles played by the intrinsic stochasticity of the dynamical system. Problems in the theory of magnetic confinement and heating of plasmas require deep understanding of the mathematical structures as well as the physical consequences of the intrinsic stochasticity and choas. Remarkable progress has been made in the understanding of these problems in the various fields of nonequilibrium statistical physics, such as fluid turbulence, critical phenomena, chemical turbulence, optical bistable systems, etc. This progress was realized by the introduction of modern mathematical concepts, such as mappings, bifurcations, scaling analyses, etc. L.F.M.

N83-10921# Nagoya Univ. (Japan). Inst. of Plasma Physics.
US-JAPAN WORKSHOP ON BURNING PLASMA PHYSICS AND ENGINEERING
Jul. 1982 328 p refs Workshop held in Nagoya, Japan, 10-13 Feb. 1982
(IPPJ-599) Avail: NTIS HC A15/MF A01

A burning plasma experiment to inlet tritium into a fusion device and to study burning plasma physics is discussed. Tokamak reactors are discussed. Radial transport of alpha particles, the effects of toroidal field ripple on superthermal particles, and magnetic surface compression heating in the heliotron device are discussed. R.J.F.

N83-10922# Nagoya Univ. (Japan). Inst. of Plasma Physics.
US-JAPAN JOINT INSTITUTE FOR FUSION THEORY WORKSHOP ON EQUILIBRIUM, STABILITY AND TRANSPORT OF NONAXISYMMETRIC SYSTEMS
Apr. 1981 74 p refs Workshop held at Nagoya, Japan, 14-18 Dec. 1981
(IPPJ-577) Avail: NTIS HC A04/MF A01

Theoretical aspects of stellarator/torsatron/heliotron, bumpy torus and tandom mirror are discussed. Main topics are equilibrium, stability and related beta limits in each confinement system. New types of stellarator with helical magnetic axis were also presented. L.F.M.

N83-10923# Toronto Univ. (Ontario). Inst. for Aerospace Studies.
THE PLASMA CURRENT MULTIPLIER Ph.D. Thesis
W. T. Shmayda Nov. 1981 150 p refs
(UTIAS-256; ISSN-0082-5255) Avail: NTIS HC A07/MF A01

The Plasma Current Multiplier (PCM) is a well-stabilized low pressure arc discharge with the capability of multiplying the initial electron current injected into the device. Experimentally the PCM gain per unit length (g) was found to decrease with increasing arc current at very low arc current densities, to remain constant at moderate arc current densities, and to decrease asymptotically towards unity at extremely high current densities. Theoretically, sheath thickening and neutral rarefaction due to local gas heating have been identified as the phenomena responsible for the PCM gain behavior at the very low and high arc current densities respectively. Experimental confirmation of the gain dependence on mass and tube radius originally predicted by the Stangeby and Allen theory was extended to several atomic species. An emissionless source of electrons was constructed and tested, thus expanding the operating capacity of this device to reactive gases. Author

N83-10924 Princeton Univ., N. J.
A RENORMALIZED THEORY OF DRIFT WAVE TURBULENCE IN SHEARED MAGNETIC FIELDS Ph.D. Thesis
Philippe Louis Similon 1981 213 p
Avail: Univ. Microfilms Order No. DA8203232

A renormalized theory of drift wave turbulence is sheared geometry is formulated with the use of systematic renormalization procedure: Kraichnan's direct-interaction approximation. Emphasis is laid on the need for a renormalized theory to preserve the energy conservation properties satisfied by the exact dynamical equations. The relation of energy conservation in a statistical theory to symmetries of the renormalized equations is discussed. Upon simplifying the direct-interaction approximation applied to a kinetic description of the electron dynamics, a simple Markovian renormalized theory is found which does satisfy the relevant form of energy conservation. A fluid-like description of the ion dynamics is derived which generalizes the Hasegawa-Mima equations by including finite gyro-radius effects and, more importantly, by containing appropriate energy sources (the resonant electrons coupled to the ions by the quasineutrality condition) and sinks (ion Landau damping, modelled by a parallel viscosity). The use of physically and empirically motivated approximations on the fluid equations leads to a closed system of equations for calculating the evolution of the spectral intensity and the relaxation rate of the correlation function. Dissert. Abstr.

N83-10925 California Inst. of Tech., Pasadena.
MEASUREMENTS OF MAGNETIC FIELD FLUCTUATIONS IN THE CALTECH RESEARCH TOKAMAK Ph.D. Thesis
Mark Allen Hedemann 1982 128 p
Avail: Univ. Microfilms Order No. DA8203355

An experimental investigation of magnetic field fluctuations in a research Tokamak plasma was performed. The fluctuations were measured with movable probes inserted directly into the plasma. Estimates of the fluctuating field strength, power spectra density, and correlation lengths were made by calculations on the raw data. The fluctuations were found to be of comparable strength for the radial and poloidal components, while the toroidal component was found to be at least a factor of 5 weaker in strength. The fluctuating field strength showed no apparent dependence on plasma current and safety factor at the edge, but increased with electron density during gas puffing and as the minor radius of measurement was decreased. The power spectral density indicated that the fluctuations could be divided into two frequency regions. The low frequency regions. The low frequency regions. The low frequency region ($f < 100$ kHz) was dominated by coherent MHD modes with correlation lengths on the order of the Tokamak size. The high frequency region appeared to be turbulent in nature with short correlation lengths in the poloidal direction, but longer correlation lengths in the radial direction. The results are compared with theories of fluctuation sources and the effects of fluctuations on anomalous electron thermal transport. Dissert. Abstr.

N83-10926 Princeton Univ., N. J.
MEASUREMENTS OF FUSION REACTIONS FROM A TOKAMAK PLASMA Ph.D. Thesis
Robert Edward Chrien 1981 121 p
Avail: Univ. Microfilms Order No. DA820322

Tokamak fusion reaction diagnostics were extended to include measurements of d-t, dp-3He, and d-d (proton branch) reactions. The confinement and slowing down of 1 MeV d-d tritons were studied y measuring d-t meutrons. The first charged fusion products to be detected in a Tokamak were the 3 MeV d-d and 14.7 MeV d- 3He protons. Beam-target d-3He reactions were measured during deuterium beam injection to study the transport and vessel retention of helium. Large d-3He reaction rates were produced by ion cyclotron heating of a 3He minority in a deuterium plasma. Measurements of the reaction rate, energy spectrum, and decay time indicate that the reactions are produced by 200 - 400 keV3He ions. Sawtooth and $m = 2$ oscillations in the proton emission were observed. Dissert. Abstr.

N83-10927# AMAF Industries, Columbia, Md.
EXPERIMENTAL INVESTIATION OF NEUTRAL PLASMA BEAM PROPAGATION ACROSS A MAGNETIC FIELD Final Report, 15 Feb. 1981 - 14 Feb. 1982
Carl Spight 14 Apr. 1982 44 p refs
(Contract F49620-81-C-0021; AF Proj. 2301)

(AD-A117765; AFOSR-82-0590TR; Rept-8205-X4300-200) Avail: NTIS HC A03/MF A01 CSCL 20/9

The conversion, described herein, of a pre-existing Hypervelocity Plasma Generator Facility to operate in a regime of importance to particle beam research has been completed. The facility is now capable of producing a plasma flow-magnetic field environment that in a scaled manner simulates the exoatmospheric propagation of a plasmoid across the geomagnetic field. A full set of flow and field diagnostics have been implemented and calibrated. It includes magnetic field probes for the slowly varying transverse background and the fast varying motionally induced fields, a laser schliren system for monitoring density gradient structure of the beam and time-of-flight fast photodiode probes for beam velocity measurements. Port access is available for monitoring directly electrostatic or electromagnetic fields associated with beam propagation. In tandem with experimental activity a theoretical analysis effort has been initiated, in interaction with theoreticians at Los Alamos National Laboratory, which intends a significant contribution to the stability analysis of a bounded plasma beam which can exhibit polarization and/or diamagnetic effects. No satisfactory theory or numerical simulations are currently available for that intrinsically three-dimensional dynamics. Author (GRA)

N83-10928# Oak Ridge National Lab., Tenn. Fusion Energy Div.

CURVILINEAR COORDINATES FOR MAGNETIC CONFINEMENT GEOMETRIES

S. P. Hirshman Aug. 1982 25 p refs

(Contract W-7405-eng-26)

(DE82-019733; ORNL/TM-8393) Avail: NTIS HC A02/MF A01

The basic properties of curvilinear coordinates are reviewed. Some applications to the description of three dimensional magnetic confinement geometries are cited. The notation used attempts to be consistent with the literature, and the relation to differential geometry is stressed. DOE

N83-10929# Oak Ridge National Lab., Tenn. Fusion Energy Div.

ANISOTROPY EFFECTS ON CURVATURE-DRIVEN FLUTE INSTABILITIES IN A HOT-ELECTRON PLASMA

D. A. Spong, H. L. Berk (Texas Univ., Austin), J. W. VanDam, and M. N. Rosenbluth Aug. 1982 23 p refs

(Contract W-7405-eng-26)

(DE82-019902; ORNL/TM-8416) Avail: NTIS HC A02/MF A01

The effects of finite parallel temperature for a hot electron plasma with sufficiently large beta of which the magnetic field scale length ((RADICAL)/sub B/) is small compared with the vacuum field radius of curvature (R) were investigated. Numerical and analytical estimates of stability boundaries are obtained for the four possible modes that can be treated in this limit: the conventional hot electron interchange, the high frequency hot electron interchange ((NU) > (NU)/sub ci/), the compressional Alfven mode, and the interacting pressure driven interchange. DOE

N83-10930# California Univ., Berkeley. Lawrence Berkeley Lab.

ACCELERATOR AND FUSION RESEARCH DIVISION

David L. Judd Jan. 1982 36 p refs

(Contract W-7405-eng-48)

(DE82-012361; LBL-14038) Avail: NTIS HC A03/MF A01

Transverse and longitudinal phase volumes are evaluated and dilution factors defined. A simpler expression for the effect of third-order geometric aberrations is given. Constraints on the final quadrupole bore radius are discussed. Parameters of the example design are considered and analyzed. The available dilution factor allows a comparison between the present induction linac example design and the rf linac designs available in 1978. Phase-space limitation on attaining high power density for spot heating experiments is discussed. DOE

N83-10931# Occidental Research Corp., Irvine, Calif.

STUDY OF ION BEAM-INITIATED INERTIAL-CONFINEMENT FUSION Final Report, 1 Jan. - 31 Dec. 1981

David Chang and David Phelps Feb. 1982 92 p refs

(Contract DE-AC08-81DP-40138)

(DE82-013935; DOE/DP-40138/1) Avail: NTIS HC A05/MF A01

A fusion program which is based on a reactor concept in which geometrically focused and time compressed beams of cold light ions and neutralizing cold electrons from large area sources are ballistically propagated over several meters through a near vacuum to implode a pellet target is discussed. The approach combines the cost advantage of efficient moderate voltage pulsed power technology with the simplicity advantage of unguided ballistic propagation. In addition, the compactness, efficiency, focusability and energy range of the system makes the approach of great interest for supplementary heating of magnetically confined fusion plasmas. Beam target interaction, beam prpagation and source accelerator design were analyzed. A one dimensional implosion and nuclear burn code indicates that significant yields can be obtained from simple targets with moderately energetic light ions. The short term objective is to demonstrate that the required degree of space time focusing can be achieved on a 200-500 keV electron neutralized ion (or plasma) beam from a simple prototype 100 sq cm low temperature zeolite source. DOE

N83-10932# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

RADIAL EFFECTS IN HEATING AND THERMAL STABILITY OF A SUB-IGNITED TOKAMAK

V. Fuchs, M. M. Shoucri, G. Thibaudeau, L. Harten, and A. Bers Feb. 1982 86 p refs

(Contract DE-AC02-78ET-51013; Grant NSF ENG-79-070947)

(DE82-009384; DOE/ET-51013/32; PFC/RR-82-6) Avail: NTIS HC A05/MF A01

The existence of thermally stable subignited equilibria of a Tokamak reactor, sustained in operation by a feedback controlled supplementary heating source, was demonstrated. The establishment of stability depends on a number of radially nonuniform, nonlinear processes whose effect is analyzed. One dimensional (radial) stability analyses of model transport equations, together with numerical results from a 1-D transport code, are used to study the heating of DT plasmas in the thermonuclear regime. It is found that plasma core supplementary heating is a thermally more stable process than bulk heating. In the presence of impurity line radiation, however, core heated temperature profiles may collapse, contracting inward from the limiter, the result of an instability caused by the increasing nature of the radiative cooling rate, with decreasing temperature. Conditions are established for the realization of a subignited high-Q, toroidal reactor plasma with appreciable output power (approx. = 2000 MW thermal). DOE

N83-10933# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

ANTENNA-PLASMA COUPLING THEORY FOR ICRF HEATING OF LARGE TOKAMAKS

A. Ram and A. Bers Mar. 1982 8 p refs Presented at the 3rd Joint Varenna-Grenoble Intern. Symp. on Heating in Toroidal Plasmas, Grenoble, France, 22-27 Mar. 1982

(Contract DE-AC02-78ET-51013)

(DE82-013226; DOE/ET-51013/38; PFC/CP-82-2; CONF-820345-8) Avail: NTIS HC A02/MF A01

The coupling characteristics of antenna structure were studied by analyzing a model where a thin current sheet is placed between a fully conducting wall and a sheet of anisotropic conductivity representing the screen. The inhomogeneous plasma in the shadow of the limiter is assumed to extend from the screen onwards away from the antenna. The excitation of the fields inside the plasma are found by analyzing the radiation properties of this current sheet antenna. In all experiments to-date, the cross-sectional plasmas are relatively small so that the RF conductor is a half-loop around the plasma in the poloidal direction. For reactor size plasmas, this cannot be done and the antenna dimensions will be small compared to the plasma cross-sections. DOE

N83-10934# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.

LOWER HYBRID RF CURRENT DRIVE AND ELECTRON-CYCLOTRON HEATING ON THE VERSATOR 2 TOKAMAK
S. C. Luckhardt, S. F. Knowlton, M. Porkolab, G. Bekefi, P. I. Bonoli, K-I Chen, B. Coppi, R. C. Englade, A. S. Fisher, K. E. Hackett et al Apr. 1982 21 p refs Presented at third Joint Varenna-Grenoble Symp. on Heating in Toroidal Plasmas, Grenoble, France, 22-27 Mar. 1982 Prepared in cooperation with NRL, Washington, D.C.
(Contract DE-AC02-78ET-51013)
(DE82-017127; DOE/ET-51013/40; PFC/CP-82-4; CONF-820345-14) Avail: NTIS HC A02/MF A01

Lower-hybrid current drive experiments (LHCD) have been carried out on the Versator 2 Tokamak in which RF injection for pulse lengths longer than the plasma L/R time generated large increases in the net toroidal current. Incremental increases, (RADICAL)I/I, of more than 35% were obtained. These current rises are strongly dependent on the relative phasing between waveguides, (RADICAL)phi = -900. In typical cases, Thomson scattering measurements during RF drive show a decrease in the central electron temperature from 240 Ev + or - 45 eV to 120 eV + or - 20 eV due to the spontaneous reduction in ohmic heating power during RF drive. DOE

N83-10935# Los Alamos Scientific Lab., N. Mex. CTR Div.
BEHAVIOR OF A PLASMA IN A HIGH-DENSITY GAS-EMBEDDED Z-PINCH CONFIGURATION Thesis
Jack Sherman Shlachter May 1982 198 p refs
(Contract W-7405-eng-36)
(DE82-017396; LA-9333-T) Avail: NTIS HC A09/MF A01

A high density Z pinch is analyzed by examining the steady state energy balance between ohmic heating and bremsstrahlung radiation losses for a plasma column in pressure equilibrium. The model is expanded to include the time-varying internal energy and results in a quasi-equilibrium prescription for the load current through a constant radius plasma channel. This set of current waveforms is useful in the design of experimental systems. The behavior of a plasma for physically realizable conditions is first examined by allowing adiabatic changes in the column radius. A more complete model is then developed by incorporating inertial effects into the momentum equation, and the resultant global MHD computational computer simulations. These comparisons demonstrate the advantages of the global MHD description over zero dimensional models. DOE

N83-10936# Oak Ridge National Lab., Tenn. Fusion Energy Div.
RAYS: A GEOMETRICAL OPTICS CODE FOR EBT
D. B. Batchelor and R. C. Goldfinger Apr. 1982 182 p refs
(Contract W-7405-eng-26)
(DE82-013391; ORNL/TM-6844) Avail: NTIS HC A09/MF A01

The theory, structure, and operation of the geometrical optics code are described. Mathematical details of equilibrium subroutines for slab, bumpy torus, and Tokamak plasma geometry are presented. Wave disperson and absorption subroutines are presented for frequencies ranging from ion cyclotron frequency to electron cyclotron frequency. Graphics postprocessors for RAYS output data are also described. DOE

N83-10937# Argonne National Lab., Ill.
DEMONSTRATION TOKAMAK POWER PLANT STUDY Interim Report
Mar. 1982 582 p refs
(Contract W-31-109-eng-38)
(DE82-016182; ANL/FPP/TM-154) Avail: NTIS HC A25/MF A01

A Tokamak power plant was studied. This design manual covers the following areas: (1) steady-state current drive, (2) impurity control and exhaust, (3) first wall and blanket, and (4) configuration and maintenance. DOE

N83-10938# Argonne National Lab., Ill. Fusion Power Program.
WILDCAT: A CATALYZED D-D TOKAMAK REACTOR
K. Evans, Jr., C. C. Baker, J. N. Brooks, R. G. Clemmer, D. A. Ehst, H. Herman, J. Jung, R. F. Mattas, B. Misra, and D. L. Smith Nov. 1981 246 p refs
(Contract W-31-109-eng-38)
(DE82-013712; ANL/FPP/TM-150) Avail: NTIS HC A11/MF A01

The WILDCAT is a conceptual design of a catalyzed D-D, Tokamak, commercial, fusion reactor. The WILDCAT utilizes the beneficial features of no tritium breeding, while not extrapolating unnecessarily from existing D-T designs. The reactor is larger and has higher magnetic fields and plasma pressures than typical D-T devices. It is more costly, but eliminates problems associated with ritium breeding and has tritium inventories and throughputs approximately two orders of magnitude less than typical D-T reactors. There are two versions, a steady state one with Alfven wave current drive and a pulsed version. Comparison with D-T devices were made, and cost and safety analyses are included. All of the major reactor systems are worked out to a level of detail appropriate to a complete, conceptual design. DOE

N83-10939# Massachusetts Inst. of Tech., Cambridge. Dept. of Physics.
OBSERVATION OF THE PARAMETRIC DECAY INSTABILITY DURING ELECTRON CYCLOTRON RESONANCE HEATING ON THE VERSATOR 2 TOKAMAK
F. S. McDermott, G. Bekefi, and M. Porkolab Mar. 1982 22 p refs
(Contract DE-AC02-78ET-51013)
(DE82-012573; DOE/ET-51013/37; PFC/RR-82-9) Avail: NTIS HC A02/MF A01

A nonlinear, three wave interaction process occurring during high power electron cyclotron heating in the Versator II Tokamak were observed. The measured spectra and the threshold power are consistent with a model in which the incident power in the extraoridinary mode of polarization decays at the upper hybrid resonance layer into a lower hybrid wave and an electron Bernstein wave. DOE

N83-10940# Oak Ridge National Lab., Tenn. Fusion Energy Div.
RIPPLING MODES IN THE EDGE OF A TOKAMAK PLASMA
B. A. Carreras, J. D. Callen (Wisconsin Univ., Madison), P. W. Gaffney, and H. R. Hicks Feb. 1982 52 p refs
(Contract W-7405-eng-26)
(DE82-007724; ORNL/TM-7989) Avail: NTIS HC A04/MF A01

A promising resistive magntohydrodynamic candidate for the underlying cause of turbulence in the edge of a Tokamak plasma is the rippling instability. A computational model for these modes in the cylindrical Tokamak approximation was developed and the linear growth and single helicity quasilinear saturation phases of the rippling modes for parameters appropriate to the edge of a Tokamak plasma was explored. Large parallel heat conduction does not stabilize these mode. Nonlinearly, individual rippling modes are found to saturate by quasilinear flattening of the resistivity profile. The saturated amplitude of the modes scales as m/sup -1/, and the radial extent of these modes grows linearly with time due to radial Vector E x Vector B0 convection. It is found that this evolution is terminated by parallel heat conduction. DOE

N83-10941# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
INSTABILITIES DRIVEN BY THE PARALLEL VARIATION OF THE ELECTROSTATIC POTENTIAL IN TANDEMS
X. S. Lee, P. J. Catto, and R. E. Aamodt May 1982 10 p refs
(Contract DE-AC03-76ET-53057)
(DE82-018409; SAI-254-82-134-LJ; PRI-42) Avail: NTIS HC A02/MF A01

It is demonstrated that the free energy associated with the sheared flow induced by the parallel variations of drift frequencies can provide a new destabilizing term. In particular, it is shown that a magnetohydrodynamic-like instability may occur in the mirror end plugs or thermal barrier region of a tandem mirror fusion device. DOE

N83-10942# Oak Ridge National Lab., Tenn. Fusion Energy Div.
RESISTIVE MHD STUDIES OF HIGH-BETA TOKAMAK PLASMAS
V. E. Lynch, H. R. Hicks, J. A. Holmes, Ben A. Carreras, and L. Garcia Feb. 1982 49 p refs Sponsored in part by the US-Spanish Joint Committee for Scientific and Technical Cooperation
(Contract W-7405-eng-26)
(DE82-008101; ORNL/TM-8082) Avail: NTIS HC A03/MF A01

The magnetohydrodynamic (MHD) activity in high beta Tokamaks such as ISX-B was calculated. These initial value calculations are built on earlier low beta techniques, but the beta effects create several new numerical issues. In addition to time stepping modules, the system of computer codes includes equilibrium solvers (used to provide an initial condition) and output modules, such as a magnetic field line follower and an X-ray diagnostic code. The transition from current driven modes a low beta to predominantly pressure driven modes at high beta is described. The nonlinear studies yield X-ray emissivity plots which are compared with experiment. DOE

N83-10943# Oak Ridge National Lab., Tenn. Fusion Energy Div.
FUSION REACTOR PLASMA-PERFORMANCE MODELING: POPCON ANALYSIS
W. A. Houlberg, S. E. Attenberger, and L. M. Hively Jun. 1982 42 p refs
(Contract W-7405-eng-26)
(DE82-016364; ORNL/TM-8282) Avail: NTIS HC A03/MF A01

A method of analyzing plasma performance over large regions of density and temperature space with time-dependent multidimensional transport codes is presented. Contour plots of global plasma parameters are shown to be a valuable tool for determining the impact of very detailed physics on plasma performance. Tokamak reactor applications illustrate the importance of plasma geometry and profile effects on both steady-state and startup behavior.DOE

N83-10944# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
EXCITATION OF QUASI-ELECTROSTATIC MODES IN A MAGNETIZED PLASMA BY A MODULATED HOLLOW E-BEAM
A. Ezzeddine and L. D. Smullin Jan. 1982 25 p refs
(Contract DE-AC02-78ET-51013)
(DE82-008441; DOE/ET-51013/28; PFC/RR-82-1) Avail: NTIS HC A02/MF A01

The power radiated into the modes of an infinite magnetized plasma by a modulated hollow electron beam is calculated for the cases of cold and warm plasmas. The beam is assumed to be sinusoidally density modulated and the induced fluctuating electric field is strong enough to quench any beam plasma interaction. Numerical results are presented for the power deposited into the plasma at frequencies near the lower hybrid frequency for different beam plasma parameters. DOE

N83-10945# Los Alamos Scientific Lab., N. Mex.
PARAMETRIC SYSTEMS ANALYSIS OF THE MODULAR STELLARATOR REACTOR (MSR)
R. L. Miller, R. A. Krakowski, and C. G. Bathke May 1982 43 p refs
(Contract W-7405-eng-36)
(DE82-016244; LA-9344-MS) Avail: NTIS HC A03/MF A01

The close coupling in the stellarator/torsatron/heliotron (S/T/H) between coil design, magnetics topology, and plasma performance complicates the reactor assessment more so than for most magnetic confinement systems. To provide an additional degree of resolution of this problem for the Modular Stellarator Reactor (MSR), a parametric systems model was applied. This model reduces key issues associated with plasma performance, first wall/blanket/shield (FW/B/S), and coil design to a simple relationship between beta, system geometry, and a number of indicators of overall plant performance. The results are used to guide more detailed, multidimensional plasma, magnetics, and coil design efforts towards technically and economically viable operating regimes. It is shown that beta values > 0.08 may be needed if the MSR approach is to be substantially competitive with other approaches to magnetic fusion in terms of system power density, mass utilization, and cost for total power output around 4.0 GWt; lower powers will require even higher betas. DOE

N83-10946# Texas Univ., Austin. Inst. for Fusion Studies.
LONG-TIME CORRELATIONS OF PERIODIC, AREA-PRESERVING MAPS
James D. Meiss, John R. Cary, Celso Grebogi (Maryland Univ., College Park), John D. Crawford, Allan N. Kaufman, and Henry D. I. Abarbanel Apr. 1982 33 p refs Prepared in cooperation with California Univ., Lawrence Berkeley Lab.
(Contracts DE-FG05-80ET-53088; DE-AC05-77ET-53044; W-7405-eng-48)
(DE82-016022; DOE/ET-53088/57; IFSR-57) Avail: NTIS HC A03/MF A01

A simple analytical decay law for correlation functions of periodic, area-preserving maps is obtained. This law is compared with numerical experiments on the standard map. The agreement between experiment and theory is good when islands are absent, but poor when islands are present. When islands are present, the correlations have a long, slowly decaying tail. DOE

N83-10947# Rensselaer Polytechnic Inst., Troy, N. Y. Dept. of Nuclear Engineering.
NEUTRON ATTENUATION IN THE LASER DUCTS OF AN INERTIAL-CONFINEMENT FUSION REACTOR
Frank Augustine, Jr. Nov. 1981 107 p refs
(Contract DE-AC02-77ET-51010)
(DE82-007195; WFPS-TME-81-031) Avail: NTIS HC A06/MF A01

Neutron streaming through the laser beam ducts of an inertial confinement fusion power plant is discussed. The neutron flux through these ducts must be attenuated by a factor of 10(12) to meet radiological safety limits. Mirrors are used to bend the path of the laser beam while cutting off a line of sight path for neutrons. The Monte Carlo Code MCNP was used to analyze the two mirror SOLASE design, which only attenuated the neutron flux by a factor of 10(3). The Westinghouse design, attenuated the neutron flux by 10(4) per mirror bend, and three mirror bends were needed. It is also revealed that the large length/diameter ratio of the ducts and the thinner mirror design are crucial to the large attenuation. It is suggested that a two mirror system can be developed, at 10(6) attenuation per mirror bend by utilizing point cross overs, a second flux trap, and acute column to column angles. DOE

N83-10948# Oak Ridge National Lab., Tenn. Fusion Energy Div.
UNCONVENTIONAL HEATING EXPERIMENTS IN EBT
J. C. Glowienka, W. A. Davis, D. L. Hillis, T. Uckan, F. M. Bieniosek (Rensselaer Polytechnic Inst.), and L. Solensten (Rensselaer Polytechnic Inst.) Apr. 1982 29 p refs
(Contract W-7405-eng-26)
(DE82-013373; ORNL/TM-8180) Avail: NTIS HC A03/MF A01

The results of two nonstandard heating experiments are discussed. In one, the fundamental electron cyclotron heating resonance at either 10.6 or 18 GHz was placed at the usual ring position in an attempt to generate rings solely with fundamental heating; this is the fundamental resonance configuration (FR). In a second experiment, an attempt was made to heat the ring and core separately by forming the ring as above with 10.6 GHz and then heating the core with the fundamental and second harmonic of 28 GHz; this is the separately coupled ring and toroidal core heating configuration (SCRATCH). In both cases, the hot electron annuli were formed and stabilized the core plasma. In FR, the rings form at the second harmonic and no significant potential structures were found. In SCRATCH, either a potential well or a potential hill could be formed. In both heating regimes, significant ion heating above that found in standard heating experiments was found. DOE

N83-10949# Oak Ridge National Lab., Tenn. Fusion Energy Div.
SECOND-CYCLOTRON-HARMONIC EMISSION MEASUREMENTS ON ISX-B
A. G. Kulchar (Tennessee Univ.), J. B. Wilgen, A. C. England, O. C. Eldridge, C. M. Loring, G. Bekefi (MIT), and K. E. Hackett (MIT) Apr. 1982 33 p refs
(Contract W-7405-eng-26)
(DE82-009938; ORNL/TM-8200) Avail: NTIS HC A03/MF A01

Second harmonic cyclotron radiation was used to measure the electron temperature during electron cyclotron heating (ECH) on the Impurity Study Experiment (ISX-B) Tokamak. The 58-GHz and 70-GHz microwave superheterodyne receivers used for the measurements are described in detail. The limitations of the use of cyclotron radiation for a temperature measurement are quantified in terms of both the density and the temperature. A comparison is made between the results from the microwave diagnostics and those from the laser Thomson scattering to demonstrate that the cyclotron emission is thermal. A brief discussion of sensitivity to runaways and to other nonthermal populations is given. DOE

N83-10950# Massachusetts Inst. of Tech., Cambridge. Plasma Fusion Center.
DESCRIPTION OF THE FOKKER-PLANK CODE USED TO MODEL ECRH OF THE CONSTANCE 2 PLASMA
Michael E. Mauel 30 Jan. 1982 24 p refs
(Contract DE-AC02-78ET-51013)
(DE82-007912; DOE/ET-51013/29; PFC/RR-82-2) Avail: NTIS HC A02/MF A01

The time-dependent Fokker-Plank code which is used to model the development of the electron velocity distribution during ECRH of the Constance 2 mirror-confined plasma is described. The ECRH is modeled a bounce-averaged quasilinear theory. The effect of collisions are found by taking the appropriate gradients of the Rosenbluth potentials, and the electron distribution is advanced in time by using a modified alternating direction implicit technique. The program was written in LISP to be run in the MACSYMA environment of the MACSYMA Consortium's PDP-10 computer. DOE

N83-10951# Georgia Inst. of Tech., Atlanta. School of Nuclear Engineering.
REVIEW OF PLASMA-IMPURITY SOURCES DURING TOKAMAK OPERATION
Bruce Dewald Jan. 1982 51 p refs
(Contract DE-AS05-78ET-52025)
(DE82-017098; GTFR-30) Avail: NTIS HC A04/MF A01

A general review is given on the present status of understanding plasma impurity sources which occur during nondisruptive Tokamak operation. Included in the review are the processes of arcing, physical sputtering, neutron sputtering, desorption, chemical erosion, blistering, and backscattering. Excluded from the study are vaporization sources which are associated with the breakdown and initial startup phases of the plasma burn and major disruptions. The aspects of each impurity source which is discussed cover the theoretical and empirical models, the significant of the impurity yield, and the relevance of the process in consideration of near term and future Tokamak plasma edge conditions. DOE

N83-10952# Columbia Univ., New York. School of Engineering and Applied Science.
OBSERVATIONS OF PLASMA ROTATION IN THE HIGH-BETA TOKAMAK TORUS 2
C. Kostek and T. C. Marshall 1982 30 p refs
(Contract DE-AC02-76ET-53016)
(DE82-019373; DOE/ET-53016/78) Avail: NTIS HC A03/MF A01

Toroidal and poloidal plasma rotation are measured in a high Beta Tokamak device by studying the Doppler sift of the 4686 A He II line. The toroidal flow motion is in the same direction as the plasma current at an average velocity of 1.6 x 10(6) cm/sec, a small fraction of the ion thermal speed. The poloidal flow follows the ion diamagnetic direction, also at an average speed of 1.6 x 10(6) cm/sec. The toroidal flow is compared with the predictions of neoclassical transport theory in the collisional regime. Mechanisms for the time evolution of the rotation are also examined. E.A.K.

N83-10953# Oak Ridge National Lab., Tenn. Physics Div.
FARADAY-ROTATION MEASUREMENTS IN ISX-B
D. P. Hutchinson, C. H. Ma, P. A. Staats, and K. L. VanderSluis 1982 16 p refs
(Contract W-7405-eng-26)
(DE82-011507; DOE/NBM-2011507) Avail: NTIS HC A02/MF A01

A submillimeter wave phase modulated polarimeter/interferometer is used for simultaneous time dependent measurement of line averaged electron density and poloidal field induced Faraday rotation along chords of the plasma column in ISX-B Tokamak. Heterodyne detection and hollow dielectric waveguide are utilized to achieve the high sensitivity required for the multichord experiment. A data analysis code is developed to reconstruct the asymmetric distributions of plasma density. The validity of the code is examined, and good agreement with density profiles measured by Thomson scattering are shown. DOE

N83-10954# Naval Research Lab., Washington, D. C. Optical Sciences Div.
CHARGE-CAPTURE EXPERIMENTS FOR PLASMA IONS AND NEUTRAL ATOMS Final Report
R. C. Elton 28 Mar. 1982 18 p refs
(Contracts DE-AI01-76ET-53002; EX-76-A-34-1010)
(DE82-014502; DOE/ET-53002/T1) Avail: NTIS HC A02/MF A01

The presence of a charge transfer effect in a high temperature plasma was successfully demonstrated, where neutral atoms (e.g., carbon, hydrogen, etc.) contribute a bound electron to stripped (C(6)) and to hydrogenic (C(5)) ions, forming excited states preferentially in the next lower ionization species. This effect was isolated from other competing effects such as free-electron recombination. Also, by measuring the absolute density of the neutral donor atoms and other vital plasma parameters in the localized region, we were able to deduce first a rate coefficient and finally a cross section that was consistent with available theoretical predictions. Upon encouragement from DOE to apply our experience to diagnostics that would be suitable for TEXT and other Tokamak devices, a concept for charge transfer from excited states of neutrals that would yield the ion density in a localized region was developed. The excited states were to be pumped to saturation with a dye laser. As part of this project we also demonstrated the utility of the hydrogenic C(5) 7-6 spectral line at 3434 A wavelength for measurement of bound electron, ionic and free-electron densities, and were instrumental in obtaining the Stark theory for measurement of the latter. DOE

N83-10955# Science Applications, Inc., Boulder, Colo. Plasma Research Inst.
RADIAL TRANSPORT, END LOSS, AND AMBIPOLARITY IN TANDEM MIRRORS
J. R. Myra and P. J. Catto Jun. 1982 41 p refs
(Contract DE-AC03-76ET-53057)
(DE82-019546; SAI-254-82-173-LJ; PRI-43) Avail: NTIS HC A03/MF A01

A simple one dimensional (radial) model describing end loss and radial transport in a tandem mirror is developed. The model enables a self consistent calculation of various ambipolar potential profiles and the center cell density profile in the presence of either conducting or insulating end walls. Results of the computation reproduce many features seen in the Tandem Mirror Experiment (TMX). Signatures of radial transport are delineated, and the effect on confinement is studied over a range of parameters. Optimal and critical values in parameter space are also investigated. DOE

N83-10956# Oak Ridge National Lab., Tenn. Fusion Energy Div.
TEMPERATURE LIMIT IN ECH HOT ELECTRON PLASMAS

N. A. Uckan Jun. 1982 17 p refs
(Contract W-7405-eng-26)
(DE82-015820; ORNL/TM-8211) Avail: NTIS HC A02/MF A01

The data from all the experiments that used single ECH frequency indicating that the hot electron temperatures increase with magnetic field strength and scale length were analyzed. They all obey rho/L approx. = constant scaling, where rho and L are the hot electron gyroradius and the magnetic field scale length. This is roughly the value at which conservation of the adiabatic invariant (SIGMA) begins to break down and it is suggested that the hot electron temperatures are limited by nonadiabatic particle behavior. It is shown that although in all previous experiments the ring temperature is determined by the rho/L criterion EBT-P is the first experiment unconstrained by this limit. DOE

N83-10957# Oak Ridge National Lab., Tenn. Fusion Energy Div.
NEUTRAL-BEAM DEPOSITION IN LARGE, FINITE-BETA NON-CIRCULAR TOKAMAK PLASMAS
R. M. Wieland and W. A. Houlberg Feb. 1982 37 p refs
(Contract W-7405-eng-26)
(DE82-008146; ORNL/TM-7658) Avail: NTIS HC A03/MF A01

A parametric pencil beam model which describes the attenuation of an energetic neutral beam moving through a Tokamak plasma is discussed. The nonnegligible effects of a finite beam cross section and noncircular shifted plasma cross sections are accounted for by using a smoothing algorithm dependent linearly on beam radius and by including information on the plasma flux surface geometry explicitly. The model is benchmarked against more complete and more time consuming two dimensional Monte Carlo calculations for the case of a large D-shaped Tokamak plasma with minor radius a = 120 cm and elongation b/a = 1.6. Deposition profiles are compared for deuterium beam energies of 120 to 150 keV, central plasma densities of 8 x 10(13) - 2 x 10(14) cm(+3), and beam orientation ranging from perpendicular to tangential to the inside wall. DOE

N83-10958# Edgerton, Germeshausen and Grier, Inc., Idaho Falls, Idaho.
METHODS TO ENHANCE BLANKET POWER DENSITY
P. Y. Hsu, L. G. Miller, T. S. Bohn, G. A. Deis, G. R. Longhurst, L. S. Masson, D. E. Wessol, and M. A. Abdou (Argonne National Lab., Ill.) Jun. 1982 25 p refs
(Contract DE-AC07-76ID-01570)
(DE82-017467; EGG-FT-5885) Avail: NTIS HC A02/MF A01

The extent to which the power density in the FED/INTOR breeder blanket test modules can be enhanced by artificial means was investigated. It is assumed that a viable approach can be developed which will allow advanced reactor blanket modules to be tested on FED/INTOR under representative conditions. DOE

76 SOLID-STATE PHYSICS

Includes superconductivity.

For related information, see also *33 Electronics and Electrical Engineering* and *36 Lasers and Masers.*

N83-10959 California Inst. of Tech., Pasadena.
LOW TEMPERATURE PHOTOLUMINESCENCE STUDIES OF SHALLOW ELECTRONIC STATES IN SEMICONDUCTORS Ph.D. Thesis
Andrew Thompson Hunter 1982 115 p
Avail: Univ. Microfilms Order No. DA8203356

Three experiments are described in which low temperature photoluminescence or selective excitation luminescence was used as a probe of shallow electronic states in three different semiconductors. A photoluminescence study of the alloy semiconductor Hg1-xCdxTe Band-to-band, band-to-acceptor, and donor-acceptor luminescence were observed in material of x = 0.32 and 0.48, and bound exciton recombination luminescence was observed in material of x = 0.48. The transient decay of bound multi-exciton complex lines in the photoluminescence spectrum of Si:P is also reported. These measurements were made to test a shell model for the multiple particle states. The decays of the alpha series of lines are compared to the decays of the beta series of lines to determine whether those transitions predicted to have common initial states decayed in an idential fashion. The results are consistent with a shell model for the states, and with more recent theoretical calculations of the level structures. Also described is the measurement of the excited state levels of two different shallow acceptors in bulk-grown GaAs. Selective excitation luminescence was used to determine the acceptor excited state energy.
Dissert. Abstr.

N83-10960 City Univ. of New York, N. Y.
CARRIER TRANSPORT IN AMORPHOUS SILICON UTILIZING PICOSECOND PHOTOCONDUCTIVITY Ph.D. Thesis
Anthony Michael Johnson 1981 174 p
Avail: Univ. Microfilms Order No. DA8203292

The development of a high-speed electronic measurement capability permitted the direct observation of the transient photoresponse of amorphous silicon (a-Si) with a time resolution of approximately 10ps. This technique was used to measure the initial mobility of photogenerated (2.1eV) free carriers in three types of a-Si having widely different densities of structural defects (i.e., as prepared by: (1) RF glow discharge (a-Si:H); (2) chemical vapor deposition; and (3) evaporation in ultra-high vacuum). In all three types of a-Si, the same initial mobility of approximately 1 cu cm/Vs at room temperature was found. This result tends to confirm the often-made suggestion that the free carrier mobility is determined by the influence of shallow states associated with the disorder in the random atomic network, and is an intrinsic property of a-Si which is unaffected by the method of preparation. The rate of decay of the photocurrent correlates with the density of structural defects and varies from 4ps to 200ps for the three types of a-Si investigated. The initial mobility of a-Si:H was found to be thermally activated. The possible application of extended state transport controlled by multiple trapping and small polaron formation is discussed.
Dissert. Abstr.

N83-10961 Carnegie-Mellon Univ., Pittsburgh, Pa.
TRICRITICAL POINTS AND ISING MODELS ON A HIERARCHICAL LATTICE Ph.D. Thesis
Miron Kaufman 1981 152 p
Avail: Univ. Microfilms Order No. DA8204163

Procedures are developed for using composition data in the three-phase region and variations of meniscus heights to determine the parameters needed to relate a classial thermodynamic model for fluid mixtures near-tricritical points to actual data. The global phase diagram for a three-component lattice gas or spin-one Ising model with single-site and nearest-neighbor ferromagnetic interactions is worked out for two dimensional lattices using a Midgal-Kadanoff recursion relation. An Ising model on a special sort of lattice, was shown by Berker and Ostlund to represent a system whose partition function can be evaluated by recursive methods. The properties of this model are discussed and the the susceptibility in zero magnetic field is shown to be infinite at all temperatures above the critical temperature, in marked contrast to the properties of the Ising model on a square or any other Braviais lattice.
Dissert. Abstr.

N83-10962*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
RADIATION DAMAGE IN FRONT AND BACK ILLUMINATED HIGH RESISTIVITY SILICON SOLAR CELLS
I. Weinberg, C. Goradia, C. K. Swartz, and H. W. Brandhorst, Jr. 1982 12 p refs Presented at 16th Photovoltaic Specialists Conf., San Diego, Calif., 27-30 1982; sponsored by IEEE
(NASA-TM-82965; E-1384; NAS 1.15:82965) Avail: NTIS HC A02/MF A01 CSCL 10A

Radiation induced degradation, in front and back illuminated 84 and 1250 ohm-cm n+pp+ silicon solar cells, was determined and cell performance interpreted using calculated optically injected charge distributions and cell voltage components. The 84 ohm-cm

cell degraded less when illuminated from the front or n+ side compared to that when illuminated from the back or p+ side. On the other hand, the 1250 ohm-cm cell degraded less when back illuminated. It is concluded that, in addition to the usual mechanisms leading to decreased collection efficiencies, loss of conductivity modulation is a major cause of radiation damage in high resistivity silicon solar cells. These results suggest that radiation damage to high resistivity n+pp+ cells can be decreased by increasing cell collection efficiency and illuminating the cells from the p+ side.
Author

N83-10963*# Old Dominion Univ., Norfolk, Va. Dept. of Mathematical Sciences.
MODELING OF THIN FILM GaAs GROWTH Progress Report, 16 Jun. - 16 Sep. 1982
John H. Heinbockel Sep. 1982 91 p refs
(Grant NAG1-148)
(NASA-CR-169366; NAS 1.26:169366) Avail: NTIS HC A05/MF A01 CSCL 20L

A potential scaling Monte Carlo model of crystal growth is developed. The model is a modification of the solid-on-solid method for studying crystal growth in that potentials at surface sites are continuously updated on a time scale reflecting the surface events of migration, incorporation and evaporation. The model allows for B on A type of crystal growth and lattice disregistry by the assignment of potential values at various surface sites. The surface adatoms are periodically assigned a random energy from a Boltzmann distribution and this energy determines whether the adatoms evaporate, migrate or remain stationary during the sampling interval. For each addition or migration of an adatom, the surface potentials are ajdusted to reflect the adsorption, migration or desorption potential changes. Author

N83-10964# Instituto de Pesquisas Espaciais, Sao Jose dos Campos (Brazil).
FREQUENCY-SELECTIVE POWER LIMITERS USING THE SUBHARMONIC GENERATION OF SPIN WAVES IN FERROMAGNETIC MATERIALS (LPSF) [LIMITADORES DE POTENCIA SELETIVOS EM FREQUENCIA, QUE USAM A GERACAO SUBHARMONICA DE ONDAS SPIN EM MATERIAIS FERRIMAGNETICOS (LPSFS)]
Mario de Souza Barretti Jun. 1982 68 p refs In PORTUGUESE; ENGLISH summary
(INPE-2451-RPE/412) Avail: NTIS HC A04/MF A01

A method of analysis and synthesis of Frequency Selective Limiters using Ferrimagnetic materials is described. Two prototypes were designed, built and tested. A comparison between the experimental and theoretical results reveals a good agreement between the theory and the experiment. Author

N83-10965 Illinois Univ., Urbana-Champaign.
PARAMAGNETIC RESONANCE STUDIES OF CRYSTALS Ph.D. Thesis
Douglas Greg Stinson 1981 194 p
Avail: Univ. Microfilms Order No. DA8203603

Materials expected to display some of the properties intrinsic to amorphous insulators were examined using electron paramagnetic resonance techniques. Electron spin-lattice relaxation probes the dynamic structure of a material, and hence were used to probe the 'Localized Tunneling States' (LTS) believe to be responsible for the anomalous low temperature thermal properties of glasses. The electron spin-lattice relaxation rate of this center was measured as a function of temperature, frequency, crystal orientation, and nuclear spin state. A theory is developed which postulates that the center relaxes by mutual transitions of the electron spin and an adjacent LTS, coupled with the emission or absorption of a phonon. Electron Nuclear Double Resonance (ENDOR) was used to study radiation induced color centers in the disordered conduction plane of Na, Li, and K beta-Alumina.
Dissert. Abstr.

N83-10966# Florida Univ., Gainesville. Dept. of Electrical Engineering.
STUDIES OF GROWTH-IN DEFECTS AND TRANSPORT PROPERTIES VERSUS GROWTH PARAMETERS IN III-V COMPOUND SEMICONDUCTORS Annual Technical Report, 11 Jun. 1981 - 10 Jun. 1982
Sheng S. Li 10 Jun. 1982 92 p refs
(Grant AF-AFOSR-0187-81; AF Proj. 2306)
(AD-A117871; AFOSR-82-0570TR) Avail: NTIS HC A05/MF A01 CSCL 20/12

The objectives of this research project are: (1) to investigate the grown-in deep level defects vs. growth parameters (e.g., growth temperature, growth rate, Ga/As ratio, and substrate orientations) in GaAs epilayers grown by liquid phase epitaxial (LPE) and vapor phase epitaxial (VPE) techniques, (2) to study the transport properties vs. growth parameters in the LPE and VPE grown GaAs, and (3) to study the effects of combined thermal and injection annealing on the grown-in defects in the VPE GaAs epilayers.
GRA

N83-10967# Massachusetts Inst. of Tech., Cambridge. Dept. of Materials Science and Engineering.
GRAIN-BOUNDARY SEGREGATION IN ALUMINUM-DOPED SILICON CARBIDE
Yo Tajima and W. D. Kingery 1981 28 p refs
(Contract DE-AS02-76ER-02390)
(DE82-015264; DOE/ER-02390/T2) Avail: NTIS HC A03/MF A01

Sintered and hot pressed aluminum doped silicon carbide; grain boundary segregation of Al observed in both materials were examined by scanning transmission electron microscopy (STEM). The Al saturated hot pressed material were analyzed. An estimated heat of segregation between 116 and 174 kJ/mol was calculated from the STEM data and equilibrium segragation theory. The data are consistent with a segregation model in which the driving force for segregation is the diffference in the nature of bonding between the solute and solvent atoms. Fast grain boundary diffusion of Al is suggested from a loss of Al during heat treatments. DOE

N83-10968# Oak Ridge National Lab., Tenn. Office of Commercial Waste Management.
PERMEABILITY OF SALT-CRYSTAL INTERFACES TO BRINE
L. O. Gilpatrick, C. F. Baes, Jr., A. J. Shor, and C. M. Canonico Jun. 1982 17 p refs
(Contract W-7405-eng-26)
(DE82-016580; ORNL-5874) Avail: NTIS HC A02/MF A01

To investigate the movement of brine along grain boundaries in polycrystalline salt, the radial flow of brine through the interface between cylindrical salt crystals was measured under axial stresses to 140 bar and temperatures to 800 C. For constant conditions, the total flow of brine showed a linear dependence on the logarithm of time, and the reciprocal permeability increased linearly with time. Loss of salt from the interface by pressure solution effects was more than enough to account for the decrease in the apparent thickness of the interface (i.e., that which may be estimated for an interface of the same permeability formed by plane parallel surfaces). This apparent thickness, initially as large as 10 sigma m, decreased to as little as 0.2 sigma m with exposure to stress and flowing brine. It decreased quickly with sudden increases in axial stress and usually increased, though not reversibly, with decreases in stress. The rate of increase in the reciprocal permeability with time was roughly proportional to the stress and to the square of the hydraulic pressure drop. Assuming similar apparent thicknesses for the grain boundaries in polycrystalline salt, permeabilities are predicted that are quite consistent with the low values reported for stressed core specimens. DOE

N83-10969# Istituto Superiore di Sanita, Rome (Italy). Lab. delle Radiazioni.
NEAR INFRARED REFRACTIVE INDEX OF BISMUTH GERMANIUM OXIDE (Bi12GeO20)
E. Burattini (CNR, Frascati, Italy), G. Cappuccio (CNR, Rome), M. Grandolfo, P. Vecchia, and S. M. Efendiev (S. M. Kirov Azerbaijan State Univ., U.S.S.R.) Rome Ist. Superiore di Sanita Jul. 1982 13 p refs

(ISS-Rad-82/2) Avail: NTIS HC A02/MF A01

The dispersion of the refractive index of Bi12GeO20 in the range 1.2 to 5.0 microns at room temperatures was obtained. Data were analyzed in terms of Ketteler, Sellmeier-Drude, Lorentz-Lorenz and Herzberger dispersion formulas. It is found that a Herzberger formula describes data up to visible region.

Author (ESA)

77 THERMODYNAMICS AND STATISTICAL PHYSICS

Includes quantum mechanics; and Bose and Fermi statistics.

For related information see also *25 Inorganic and Physical Chemistry* and *34 Fluid Mechanics and Heat Transfer.*

No abstracts in this category.

80 SOCIAL SCIENCES (GENERAL)

Includes educational matters.

N83-10970*# Akron Univ., Ohio. Dept. of Civil Engineering.

NASA LeRC/AKRON UNIVERSITY GRADUATE COOPERATIVE FELLOWSHIP PROGRAM AND GRADUATE STUDENT RESEARCHERS PROGRAM Interim Report

Demeter G. Fertis and A. L. Simon Oct. 1981 95 p refs

(Grants NAG3-50; NGT-36-001-800; NGT-36-001-801)

(NASA-CR-167943; NAS 1.26:167943; NAUFP-202-1) Avail: NTIS HC A05/MF A01 CSCL 05I

The requisite methodology to solve linear and nonlinear problems associated with the static and dynamic analysis of rotating machinery, their static and dynamic behavior, and the interaction between the rotating and nonrotating parts of an engine is developed. Linear and nonlinear structural engine problems are investigated by developing solution strategies and interactive computational methods whereby the man and computer can communicate directly in making analysis decisions. Representative examples include modifying structural models, changing material, parameters, selecting analysis options and coupling with interactive graphical display for pre- and postprocessing capability. S.L.

81 ADMINISTRATION AND MANAGEMENT

Includes management planning and research.

N83-10971# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).

COPLAN, AN INTERACTIVE SYSTEM FOR PROJECT MANAGEMENT [COPLAN, UM SISTEMA INTERATIVO PARA GERENCIA DE PROJETOS]

Heloisa Galvao Villela Santos Borges, Acacio Feliciano, and Celso deRennaSouza Jul. 1982 66 p refs In PORTUGUESE; ENGLISH summary

(INPE-2456-PRE/151) Avail: NTIS HC A04/MF A01

Two interfaces for the packages PROMIS/TIME and PROMIS/RAM, used in large project planning, control, and resource allocation, with the purpose of adapting them for (user friendly) interactive use are described. The user is guided by displayed instruction and enters data for network data bases, PERT networks, their events, activities, etc., through formatted displays. The system produces various reports and graphic outputs at the user's command. S.L.

N83-10972*# Stanford Univ., Calif. Dept. of Engineering-Economic Systems.

RESEARCH IN SPACE COMMERCIALIZATION, TECHNOLOGY TRANSFER, AND COMMUNICATIONS Annual Report, 1 Oct. 1981 - 30 Sep. 1982

30 Sep. 1982 19 p

(Contract NASw-3204)

(NASA-CR-169447; NAS 1.26:169447) Avail: NTIS HC A02/MF A01 CSCL 05A

Research and internship programs in technology transfer, space commercialization, and information and communications policy are described. The intern's activities are reviewed. On-campus research involved work on the costs of conventional telephone technology in rural areas, an investigation of the lag between the start of a research and development project and the development of new technology, using NASA patent and patent waiver data, studies of the financial impact and economic prospects of a space operation center, a study of the accuracy of expert forecasts of uncertain quantities and a report on frequency coordination in the fixed and fixed satellite services at 4 and 6 GHz. S.L.

N83-10973# National Governors Association/Council of State Planning Agencies, Washington, D. C.

STATE-LOCAL POLICY MANAGEMENT PROJECT, 1981 Final Report

Aug. 1981 86 p

(Grant NSF ISP-78-20518)

(PB82-192600; NSF/ISP-81028) Avail: NTIS HC A05/MF A01 CSCL 05A

Case studies which explore approaches for increasing state and local coordination in planning and managing programs in areas with significant scientific and technical components such as energy and environment are described. Specifically, the case studies reveal efforts of various states in the areas of energy conservation, weatherization, emergency preparedness, and air quality. Successes and failures of a decentralized approach to energy conservation are documented; success of a thermal and lighting efficiency standards program is discussed; state aid for local energy conservation programs is reviewed; and the success of a weatherization program is examined. Pilot programs in weatherization are shown to have led a statewide effort. Two projects in emergency preparedness are documented and factors for success are listed. In addition, long range planning for fuel shortages is examined and the benefits of regional planning are noted. GRA

N83-10974# Purdue Univ., Lafayette, Ind.

MULTI ATTRIBUTE AND MULTIPLE CRITERIA APPROACHES FOR DETERMINING BAYESIAN ACCEPTANCE PLANS IN QUALITY CONTROL AND AUDITING Technical Report, 1 Sep. 1980 - 30 Nov. 1981

A. Ravindran and H. M. Moskowitz Nov. 1981 113 p refs

(Grant NSF ECS-80-07103)

(PB82-203100; NSF/ECS-81014) Avail: NTIS HC A06/MF A01 CSCL 05A

The development of a bicriterion model for acceptance sampling in quality control is discussed. Such a model allows explicit consideration of conflicting goals that are not considered in existing acceptance sampling schemes. A quality measure and a cost measure are used as the conflicting criteria. Two optimization procedures for solving the model are explored, the first of which involves the measurement of a decisionmaker's utility function and subsequent optimization viA an implicit enumeration algorith. The second method employs an interactive procedure. Aiso presented is a laboratory study that compares the interactive process to utility function management methods in a quality control setting. Claims that interactive procedures are easier to use and achieve a more satisfactory solution are supported. The claim that interactive procedures provide more insight into the relationships of the criteria is refuted. An interactive procedure under uncertainty is developed and illustrated for the bicriterion case. Efficiency under uncertainty is defined, and conditions that guarantee efficiency are proven. Author

N83-10975# Auburn Univ., Ala. Dept. of Economics.
ALLOCATING R AND D RESOURCES: A STUDY OF THE DETERMINANTS OF R AND D BY CHARACTER OF USE Final Report
Albert W. Link Aug. 1982 105 p refs
(Grant NSF PRA-80-09552)
(PB82-209800; NSF/PRA-81019) Avail: NTIS HC A06/MF A01 CSCL 05A

An empirical analysis is presented of firm and industry characteristics important in determining a firm's allocation of its research and development (R&D). It was found that a set of firm characteristics can be identified as influencing the firm's allocation of its R&D. Factors important in determining the allocation were found to be unimportant in determining the overall level of R&D spending. The statistical analysis illustrates that profitability and the receipt of Federal R&D are significant determinants of the firm's level of R&D spending, holding constant characteristics of the industry in which the firm produces. In the regression analysis, three industry characteristics are held constant: market concentration, indexes of technological opportunity, and product complexity. The report includes primary data used in the analysis, development of a model of the R&D allocation among its alternative uses, testing of several propositions related to determinants of the R&D allocation; and a discussion of policy considerations. The analysis attempts to illustrate that R&D is a heterogeneous category of activities and that no one set of factors influences the firm's decision to allocate R&D funds to any particular use category. Author

N83-10976# Technical Research Centre of Finland, Espoo. Textile Lab.
APPRAISAL OF THE COMAX CONCEPTION
Ben Malmstroem Jan. 1981 72 p refs
(PB82-204413; TIEDONANTO-22; ISBN-951-38-1137-9; ISSN-0355-3639) Avail: NTIS HC A04/MF A01 CSCL 05A

The conceptual development of the projected account or Comax conception, a unifying model of the real business system to support the managing process of plan, execute, and review and with the capacity to adapt common management techniques of applied mathematics is reviewed. The review is given a formal structure and is followed by a formalistic proof of evidence of efficacy, and a discussion of general features and development of the Comax conception. GRA

N83-10977# National Academy of Sciences - National Research Council, Washington, D. C. Committee on Independent Research and Development Issues.
THE DOD-NASA INDEPENDENT RESEARCH AND DEVELOPMENT PROGRAM: ISSUES AND METHODOLOGY FOR AN IN-DEPTH STUDY Final Report
1981 90 p refs
(PB82-192741) Avail: NTIS HC A05/MF A01 CSCL 05A

The Department of Defense and the National Aeronautics and Space Administration reimburse contractors, as overhead items, for the expenses of certain independently chosen R and D projects judged relevant to military needs. These independent R and D (IR&D) expenses arerecognized by the agencies as necessary costs of doing business. The agencies also expect the system of reimbursement to help develop innovative technologies and foster strong and competitive contractor industries. The agencies set a ceiling (by formula or negotation) on each company's recovery. Bid and proposal costs are also reimbursed, lumped with IR&D costs under a single ceiling for each company. Critics have quarreled with many of the system's features, from accounting procedures to the system's fundamental propriety. The Committee on Independent Research and Development Issues identified and analyzed the issues raised by critics and proponents, compared and interpreted prior studies, and developed guidelines and a methodology for a comprehensive study of the IR&D system; the committee's report contains in addition a detailed history of the IR&D system and a catalog of proposed alternatives to the current system. Author

82 DOCUMENTATION AND INFORMATION SCIENCE

Includes information storage and retrieval technology; micrography; and library science.

For computer documentation see *61 Computer Programming and Software*.

N83-10978* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY, A CONTINUING BIBLIOGRAPHY. SUPPLEMENT 21. SECTION 1: ABSTRACTS
Jul. 1982 45 p
(NASA-SP-7039(21)-Sect-1; NAS 1.21:7039(21)-Sect-1) Avail: NTIS HC $8.50 CSCL 05B

Abstracts are cited for 87 patents and applications introduced into the NASA scientific and technical information system during the period of January 1982 through June 1982. Each entry consists of a citation, an abstract, and in mose cases, a key illustration selected from the patent or patent application. S.L.

N83-10979* National Aeronautics and Space Administration, Washington, D. C.
NASA PATENT ABSTRACTS BIBLIOGRAPHY, A CONTINUING BIBLIOGRAPHY. SUPPLEMENT 21. SECTION 2: ABSTRACTS
Jul. 1982 701 p
(NASA-SP-7039(21)-Sect-2; NAS 1.21:7039(21)-Sect-2) Avail: NTIS HC $12.50 CSCL 05B

Entries for 4000 patents and patent applications citations for the period May 1969 through June 1982 are listed. Subject, invention, source, number and accession number indexes are included. S.L.

N83-10980* National Aeronautics and Space Administration, Washington, D. C.
NASA THESAURUS. VOLUME 1: HIERARCHICAL LISTING 1982 Edition
Jul. 1982 840 p 2 Vol.
(NASA-SP-7051-Vol-1) Avail: NTIS HC $35.00 CSCL 05B

There are 16,713 postable terms and 3,716 nonpostable terms approved for use in the NASA scientific and technical information system in the Hierarchical Listing of the NASA Thesaurus. The generic structure is presented for many terms. The broader term and narrower term relationships are shown in an indented fashion that illustrates the generic structure better than the more widely used BT and NT listings. Related terms are generously applied, thus enhancing the usefulness of the Hierarchical Listing. Greater access to the Hierarchical Listing may be achieved with the collateral use of Volume 2 - Access Vocabulary. Author

N83-10981* National Aeronautics and Space Administration, Washington, D. C.
NASA THESAURUS. VOLUME 2: ACCESS VOCABULARY 1982 Edition
Jul. 1982 400 p 2 Vol.
(NASA-SP-7051-Vol-2) Avail: NTIS HC $20.00 CSCL 05B

The Access Vocabulary, which is essentially a permuted index, provides access to any word or number in authorized postable and nonpostable terms. Additional entries include postable and nonpostable terms, other word entries, and pseudo-multiword terms that are permutations of words that contain words within words. The Access Vocabulary contains, 40,661 entries that give increased access to he hierarchies in Volume 1 - Hierarchical Listing. Author

N83-10982# Sandia Labs., Albuquerque, N. Mex. Engineering Information Systems Div.
DESCRIPTION OF THE SNLA AUTOMATED DESIGN DATA SYSTEM (ADDS)
Kenneth J. Shumway Jun. 1982 71 p
(Contract DE-AC04-76DP-00789)

(DE82-018347; SAND-82-0322) Avail: NTIS HC A04/MF A01

Much of the collecting, storing, processing, and reporting of administrative data associated with engineering drawings was automated. Techniques and processes used include data base, source document automation, interagency data messages and file audits, and use of computer terminals for data entry and retrieval. Programs now produce computerized material lists, engineering structured reports; drawing and vault management reports; engineering release and change documents; and other specialized reports. As a result of this massive automation effort, quality and timeliness of data files were enhanced. Although this automation effort, known collectively as the Automated Design Data System (ADDS), is broad in its present scope, it is far from complete. Anticipated future projects are listed. DOE

N83-10983# California Univ., Berkeley. Lawrence Berkeley Lab. Computer Science and Mathematics Dept.

COMPARATIVE PERFORMANCE EVALUATION OF DATABASE MANAGEMENT SYSTEMS

Margaret M. Keenan Oct. 1981 187 p refs

(Contract W-7405-eng-48)

(DE82-010165; LBL-13700) Avail: NTIS HC A09/MF A01

The performance (and resource requirements) of various database management systems are compared for different applications. The impact of the various combinations of features and implementation techniques present in different systems on their performances and resource requirements make these systems difficult to assess. The functional performances of each system for a given application, and the identification of significant differences between system performances are emphasized. A high level framework was established which allows additional database management systems and versions of the previously tested systems to be added to the pool of results with a minimum of time and effort. This required a balance between specificity and generality in the overall test design. DOE

N83-10984# California Univ., Livermore. Lawrence Livermore Lab. Electronics Engineering Dept.

WORD PROCESSING/OFFICE INFORMATION SYSTEMS: MANAGERS PERSPECTIVE, A MANAGEMENT TOOL

Margaret B. Hamilton 27 May 1982 74 p

(Contract W-7405-eng-48)

(DE82-016000; UCID-19393) Avail: NTIS HC A04/MF A01

An overview of word processing systems and office information systems is presented. Emphasis is on the equipment that makes up such systems, how the systems function in the office workflow, the varying capabilities of the systems, the required maintenance and housekeeping of the systems, and the support resources available. DOE

N83-10985# Los Alamos Scientific Lab., N. Mex.

PLOTT: A GRAPHICS APPLICATION PACKAGE FOR PRODUCTION OF PUBLICATION-QUALITY GRAPHS

Gary Cort Apr. 1982 60 p

(Contract W-7405-eng-36)

(DE82-015031; LA-9278-MS) Avail: NTIS HC A04/MF A01

The use of the PLOTT graphics package is documented. This package consists of application programs for constructing publication quality graphs, an interactive setup routine, and appropriate data files. The DISSPLA based FORTRAN routines are designed for implementation on time sharing operating system and offer an uncomplicated method for generating high quality graphs. The package features: multiple data sets and line types; an expanded set of plotting symbols; simplified legend construction; reproduction scaling; error bars; user defined functions; multicolored plots; CGS metafile creation; and choice of linear, semilog or log-log axis sets. DOE

N83-10986# California Univ., Los Angeles. Graduate School of Management.

A LOGICAL DATABASE DESIGN FRAMEWORK Final Report

Peter Pin-Shan Chen, Ilchoo Chung, and Dennis Perry Apr. 1982 260 p refs

(Contract NBS-80-SBCA-0528)

(PB82-203316; NBS-GCR-82-390) Avail: NTIS HC A12/MF A01 CSCL 09B

The logical database design process is broken down into five major tasks: requirements analysis, global information modeling, conceptual schema design, local information modeling, and the translation of the conceptual schema into schemas for commercial DBMSs (e.g., relational, hierarchical, and network schemas). For each task of logical database design, the following information is included: major subtasks and considerations required by that task; techniques/tools which are useful in carrying out the task; personnel required by the task; organization structure of the project team assigned to the task; user involvement and authorization process for the task; expected inputs and outputs of the task; guidelines for input data collection and output data generation; and the role of the database director in the task (for some tasks). GRA

N83-10987# Massachusetts Inst. of Tech., Cambridge.

INVESTIGATIONS OF INTERLIBRARY RESOURCE-SHARING NETWORKS Final Report, 1979 - 1982

J. Francis Reintjes Mar. 1982 85 p refs

(Grant NSF IST-78-23251)

(PB82-202417; LIDS-R-1176) Avail: NTIS HC A05/MF A01 CSCL 05B

Investigations of electronic interlibrary resource sharing networks were made for the purpose of determining their applicability to library operations and the ability of technology to meet operational and economic requirements. It has been found that electronic networks of libraries are especially suited to the movement of the information content of serials between nodes. Requests involving serials are usually for individual articles which average eight or so pages, a tractable number for document delivery by electronic means. A system configuration is proposed. It consists of an online computer ordering subsystems and a separate digital document delivery subsystem. The salient elements of each subsystem are discussed, including the combined index of document holdings, the ordering system software, document scanner and printers, communication links, and requirements for data compression. Also presented is an analysis of the capital equipment and operating costs for a four node network with a maximum separation distance between nodes of ten miles and a ten year projection of total costs. The report concludes with a discussion of advantages of resource sharing networks to libraries and end users, and barriers to their immediate adoption.

Author (GRA)

83 ECONOMICS AND COST ANALYSIS

Includes cost effectiveness studies.

No abstracts in this category.

84 LAW AND POLITICAL SCIENCE

Includes space law; international law; international cooperation; and patent policy.

N83-10988# Committee of Conference (U. S. Congress).

MAKING APPROPRIATIONS FOR THE DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT, AND FOR SUNDRY INDEPENDENT AGENCIES, BOARDS, COMMISSIONS, CORPORATIONS, AND OFFICES

Washington GPO 1982 17 p Rept. to accompany H.R. 6956 presented by Comm. of Conf., 97th Congr., 2d Sess., 29 Sep. 1982

(H-Rept-97-891; GPO-89-006) Avail: US Capitol, House Document Room

A joint statement to the House and Senate is presented in explanation of the effect of the action agreed upon by the managers of the conference of the disagreeing votes of the two Houses on the amendments of the Senate to the (H.R.6956). Recommended changes for all four titles are listed and the total new budget (obligational) authority for the fiscal year 1983 is compared to the fiscal year 1982 amount, the 1983 budget estimates, and the House and Senate bills for 1983. For individual title, see N83-10989.

N83-10989# Committee of Conference (U. S. Congress).
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
In its Making Appropriations for the Dept. of Housing and Urban Develop., and for Sundry Independent Agencies, Boards, Comm., Corporations, and Offices 1982 p 11-12 (For primary document see N83-10988 01-84)
Avail: US Capitol, House Document Room

Recommendations for resolving disagreements concerning Senate amendments to the House bill covering appropriations to NASA are presented. Changes in budget allocations are listed for space shuttle; Centaur upper stage development; and advanced communications satellite; planetary mission operations and data analysis; technology transfer and/or technology utilization; and for operation of the infrared telescope facility at Mauna Kea, Hawaii. Of the $280,000,000 available for aeronautical research and technology, $192,000,000 is to be available for the design, development, and procurement of liquid hydrogen-liquid oxygen upper stages. Appropriations for construction of facilities and for program management are included. A.R.H.

85 URBAN TECHNOLOGY AND TRANSPORTATION

Includes applications of space technology to urban problems; technology transfer; technology assessment; and surface and mass transportation.

For related information see *03 Air Transportation and Safety, 16 Space Transportation,* and *44 Energy Production and Conversion.*

N83-10990# National Inst. for Transport and Road Research, Pretoria (South Africa). 'Group for Vehicle Safety.
THE TRANSPORTATION OF HAZARDOUS MATERIALS
J. C. Hillman Apr. 1981 46 p refs
(RV/1/81) Avail: NTIS HC A03/MF A01

All the aspects that could increase the likelihood of dangerous chemical or petroleum transportation disasters occurring are discussed. the preparedness of emergency services is discussed. Improvements or changes required to minimize this possibility are recommended. The training and ability of vehicle drivers are discussed at length. Forthcoming regulations under the Hazardous Substances Act No. 15 of 1973 are examined and the effects of over-restrictive legislation considered. It is concluded that legislation promulgated gradually to reinforce voluntary industrial practices will ultimately restrict this type of transport to the safety-conscious and competent operator, therefore minimizing the risk as much as possible. R.J.F.

N83-10991*# Mechanical Technology, Inc., Latham, N. Y.
AUTOMOTIVE STIRLING ENGINE MOD 1 DESIGN REVIEW, VOLUME 2 Final Report
Aug. 1982 573 p
(Contracts DEN3-32; DE-AI01-77CS-51040)
(NASA-CR-167936; DOE/NASA/0032-17-Vol-2; NAS 1.26:167936; Rept-80ASE142DR1-Vol-2) Avail: NTIS HC A04/MF A01 CSCL 13F

The auxiliaries and the control system for the ASE MOD I: (1) provide the required fuel and air flows for a well controlled combustion process, generating heat to the Stirling cycle; (2) provide a driver acceptable method for controlling the power output of the engine; (3) provide adequate lubrication and cooling water circulation; (4) generate the electric energy required for engine and vehicle operation; (5) provide a driver acceptable method for starting, stopping and monitoring the engine; and (6) provide a guard system, that protects the engine at component or system malfunction. The control principles and the way the different components and sub-systems interact are described as well as the different auxiliaries, the air fuel system, the power control systems and the electronics. The arrangement and location of auxiliaries and other major components are also examined. A.R.H.

N83-10992# Transportation Research Board, Washington, D.C.
THE APPLICATION OF TRAFFIC SIMULATION MODELS
1981 120 p refs Proc. of a Conf. held in Williamsburg, Va., 3-5 Jun. 1981; sponsored by DOT
(PB82-207226; TRB/SR-194; ISBN-0-309-03262-8; ISSN-0360-859X) Avail: NTIS HC A06/MF A01 CSCL 13B

Traffic simulation models are considered. Author (GRA)

N83-10993# Michigan Univ., Ann Arbor. Highway Safety Research Inst.
PASSENGER CAR OCCUPANT EJECTION Final Report, Jun. 1980 - Sep. 1981
Bruce Bertram and James ODay Aug. 1981 55 p refs
(PB82-202409; UM-HSRI-81-42) Avail: NTIS HC A04/MF A01 CSCL 13F

The influence of various vehicle systems in preventing (or not preventing) occupant ejection from passenger cars was determined. Accident data from the National Highway Traffic Safety Administration's Fatal Accident Reporting System and from the National Crash Severity Study (NCSS) were examined. In addition, a special analysis was completed for a subset of the NCSS data in which only one of two front seat occupants was ejected. The reduction in ejection rate associated with the advent of improved door latches and glazing components appears to have levelled off. In the mix of cars of varied size, there are complex interactions of factors associated with ejection. While smaller cars generally have higher ejection rates, these are largely explained by a higher propensity to rollover and by the predominance of young drivers in these cars. Author (GRA)

N83-10994# Office of Technology Assessment, Washington, D.C.
REPORT TO THE CONGRESS FOR 1981 Annual Report
May 1982 114 p
(PB82-202862; OTA-A-131; AR-9) Avail: NTIS HC A06/MF A01 CSCL 05A

The activities of the Office of Technology Assessment for the calendar year 1981 are summarized. Included are discussions of its organization and operations, summaries of assessments completed during 1981, descriptions of work in progress, and a list of staff members, advisors, and panel members. A copy of the Technology Assessment Act of 1972 is also included. J.D.

88 SPACE SCIENCES (GENERAL)

No abstracts in this category.

89 ASTRONOMY

Includes radio and gamma-ray astronomy; celestial mechanics; and astrometry.

N83-10995*# Palomar Observatory, Pasadena, Calif.
INFRARED PROPERTIES OF SERENDIPITOUS X-RAY QUASARS
G. Neugebauer, B. T. Soifer, K. Matthews, B. Margon (Washington Univ.), and G. A. Chanan (Columbia Univ.) [1982] 18 p refs

Sponsored in part by Sloan Foundation
(Contract NAS8-30753; Grants NGL-05-002-207; NSF AST-77-27745; NSF AST-80-17335)
(NASA-CR-169454; NAS 1.26:169454) Avail: NTIS HC A02/MF A01 CSCL 03A

Near infrared measurements were obtained of 30 quasars originally found serendipitously as X-ray sources in fields of other objects. The observations show that the infrared characteristics of these quasars do not differ significantly from those of quasars selected by other criteria. Because this X-ray selected sample is subject to different selection biases than previous radio and optical surveys, this conclusion is useful in validating previous inferences regarding the infrared colors of 'typical' quasars. Author

N83-10996*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
OBSERVATIONAL TESTS OF BARYON SYMMETRIC COSMOLOGY
F. W. Stecker Sep. 1982 9 p refs Submitted for publication
(NASA-TM-84006; NAS 1.15:84006) Avail: NTIS HC A02/MF A01 CSCL 03A

Observational evidence for Baryon symmetric (matter/antimatter) cosmology and future observational tests are reviewed. The most significant consequences of Baryon symmetric cosmology lie in the prediction of an observable cosmic background of gamma radiation from the decay of pi(0)-mesons produced in nucleon-antinucleon annihilations. Equations for the prediction of the amma ray background spectrum for the case of high redshifts are presented. The theoretical and observational plots of the background spectrum are shown to be in good agreement. Measurement of cosmic ray antiprotons and the use of high energy neutrino astronomy to look for antimatter elsewhere in the universe are also addressed. M.G.

N83-10997*# Washington Univ., Seattle.
IUE OBSERVATIONS OF HERBIG-HARO AND RELATED OBJECTS Status Report
Karl-Heinz Boehm [1982] 7 p refs
(Grant NAG5-45)
(NASA-CR-169367; NAS 1.26:169367) Avail: NTIS HC A02/MF A01 CSCL 03A

The I.U.E. spectra of the Herbig-Haro objectes H-H 1, H-H 2H, H-H 2G and H-H 32 A are considered. In order to obtain a better understanding of the physics of these intriguing objects and of the formation of the ultraviolet continua and emission lines in H-H objects, the UV spectra of the Cohen-Schwartz star, the T Tauri star AS 353A, and of the reflection nebula NGC 1999 (which is illuminated by the young object V 380 Orionis), are also examined. Author

N83-10998*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
THE PECULIAR EXTINCTION OF HERSCHEL 36
B. Donn, J. H. Hecht (Aerospace Corp.), H. L. Helfer (Rochester Univ.), J. Wolf (Rochester Univ.), and J. L. Pipher (Rochester Univ.) 1 Oct. 1982 20 p refs
(NASA-TM-84893; NAS 1.15:84893; ATR-82(8454)-3) Avail: NTIS HC A02/MF A01 CSCL 03A

The extinction of Herschel 36 was measured and found to be peculiar in the same sense as that observed in Orion. Following the treatment of Mathis and Wallenhorst, this can be explained by the presence of large silicate and graphite grains than are normally found in the interstellar medium. Correcting the stellar flux for foreground estinction results in a residual extinction curve for the associated dust cloud, with an unusually small normalized extinction (less than 1.0) at 1500 A. This low UV extinction may be due to the effects of scattering by the dust cloud material. Author

N83-10999*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
FAR INFRARED SUPPLEMENT: CATALOG OF INFRARED OBSERVATIONS
D. Y. Gezari, M. Schmitz, and J. M. Mead Oct. 1982 100 p
(NASA-TM-84001; NAS 1.15:84001) Avail: NTIS HC A05/MF A01 CSCL 03A

The development of a new generation of orbital, airborne and ground-based infrared astronomical observatory facilities, including the infrared astronomical satellite (IRAS), the cosmic background explorer (COBE), the NASA Kuiper airborne observatory, and the NASA infrared telescope facility, intensified the need for a comprehensive, machine-readable data base and catalog of current infrared astronomical observations. The Infrared Astronomical Data Base and its principal data product, this catalog, comprise a machine-readable library of infrared (1 micrometer to 1000 micrometers) astronomical observations published in the scientific literature since 1965. Author

N83-11000# Palomar Observatory, Pasadena, Calif.
SECONDARY STANDARD STARS FOR ABSOLUTE SPECTROPHOTOMETRY
J. B. Oke and J. E. Gunn (Princeton Univ., N.J.) [1982] 15 p refs
Avail: NTIS HC A02/MF A01

Based on an adopted absolute spectral energy distribution for the primary standard star alpha Lyrae, absolute fluxes are given for four very metal-deficient F-type subdwarfs HD 19445, HD84937, BD+26 deg 2606, and BD+17 deg 4708. Somewhat inferior data are also given for HD 140283. The data are given for 40 A bands and cover the wavelength range from 3080 to 12,000 A. The four stars, all near magnitude 9 and distributed around the sky, are intended as secondary standards or absolute spectrophotometry. M.G.

N83-11001*# Palomar Observatory, Pasadena, Calif.
INFRARED/OPTICAL ENERGY DISTRIBUTIONS OF HIGH REDSHIFTED QUASARS
B. T. Soifer, G. Neugebauer, J. B. Oke, K. Matthews, and J. H. Lacy 23 Apr. 1982 21 p refs
(NASA-CR-169436; NAS 1.26:169436) Avail: NTIS HC A02/MF A01 CSCL 03A

Measurements at 1.2, 1.6 and 2.2 microns were combined with visual spectrophotometry of 21 quasars having redshifts $z >$ or $= 2.66$. The primary result is that the rest frame visual/ultraviolet continua of the high redshift quasars are well described by a sum of a power law continuum with slope of approximately -0.4 and a 3000 A bump. The rest frame visual/ultraviolet continua of these quasars are quite similar to that of 3C273, the archetype of low redshift quasars. There does not appear to be any visual/ultraviolet properties distinguishing high redshift quasars selected via visual or radio techniques. M.G.

90 ASTROPHYSICS

Includes cosmology; and interstellar and interplanetary gases and dust.

N83-11002 Illinois Univ., Urbana-Champaign.
THE EVOLUTION OF MASSIVE STARS: THE INFLUENCE OF INITIAL COMPOSITION AND MASS LOSS Ph.D. Thesis
Wendee M. Brunish 1981 179 p
Avail: Univ. Microfilms Order No. DA8203412

The evolution of 15, 30, and 40 M annual stars with compositions Y = 0.28 and Z = 0.02, 0:01, 0.001 and 0.0002, and of 50 M annual stars with Y = 0.28, Z = 0.0002 are studied. These models were evolved through core helium burning up to the point of carbon ignition. All models were evolved with and without the inclusion of mass loss. A moderate mass loss rate with different efficiency factors was used for main sequence and blue supergiant stars. Results indicate that all massive stars ignite helium as blue supergiants. Stars with initial masses M sub i $<$ 30 M, annual evolve redward very slowly and spend less than 1% of their total lifetimes as red supergiants. Above 30 M annual the rate of redward evolution increases dramatically. The effect of a reduction in the

initial metal content relative to solar abundances causes the models to be bluer and, in general, slightly more luminous at comparable stages of evolution. Dissert. Abstr.

91 LUNAR AND PLANETARY EXPLORATION

Includes planetology; and manned and unmanned flights. For spacecraft design see *18 Spacecraft Design Testing, and Performance.* For space stations see *15 Launch Vehicles and Space Vehicles.*

N83-11003 California Inst. of Tech., Pasadena.
ENERGETIC OXYGEN AND SULFUR IONS IN THE JOVIAN MAGNETOSPHERE Ph.D. Thesis
Neil Gehrels 1982 134 p
Avail: Univ. Microfilms Order No. DA8203354

Observations of 1 to 20 MeV/nuc oxygen, sodium, and sulfur ions in the Jovian magnetosphere are reported. Measurements made by the cosmic ray subsystem on Voyager 1 and 2 are used to calculate abundances and energy spectra in the region from 5 to 20 Jovian radii (R sub j). The phase space density of the oxygen ions calculated from the spectra has a positive radial gradient between 6 and 17 R sub j, indicating an inward diffusive flow. The diffusion coefficient upper limit at 9 R sub j is approximately one hundred thousandth S 0.1 power. This limit, combined with the analysis of Voyager plasma observations, implies an upper limit to the mass loading rate near Io of approximately 10 to 28 ions/s. The energetic oxygen lifetime is within an order of magnitude of the strong pitch angle diffusion lifetime in this region, with the largest total numbers of particles lost between 7.5 and 12.5 R sub j. Dissert. Abstr.

N83-11004*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
Io: ESCAPE AND IONIZATION OF ATMOSPHERIC GASES Annual Report, 15 Apr. 1981 - 14 Apr. 1982
William H. Smyth Apr. 1982 23 p refs
(Contract NASw-3503)
(NASA-CR-169443; NAS 1.26:169443) Avail: NTIS HC A02/MF A01 CSCL 03B

The model for the Io oxygen cloud was improved and is now capable of calculating the two dimensional sky plane intensity for the 6300A, 1304A and 880A lines, where volume excitation and ionization rates are determined by impact collisions with Io plasma torus electrons. These three emission lines are those for which observations were performed by ground based, rocket, Earth orbiting satellites and Voyager spacecraft nstruments. Comparison of model results with observations at 6300A suggests an isotropic oxygen flux from Io of about (1.5 to 3.0) x 10 to the 9th power atoms cm/sec or an overall source rate of (0.6 to 1.2) x 10 to the 27th power atoms/sec. A model for the expected but yet undetected Io sulfur cloud was also developed and very preliminary results are discussed. Quantitative analysis of the Io sodium cloud focused upon the initial task of acquiring and preliminary evaluation of sodium cloud and Io plasma torus data. S.L.

N83-11005*# Atmospheric and Environmental Research, Inc., Cambridge, Mass.
OTHER SATELLITE ATMOSPHERES: THEIR NATURE AND PLANETARY INTERACTIONS Annual Report, 1 Jun. 1981 - 31 May 1982
William H. Smyth Jul. 1982 119 p refs
(Contract NASw-3387)
(NASA-CR-169439; NAS 1.26:169439) Avail: NTIS HC A06/MF A01 CSCL 03B

The Io sodium cloud model was successfully generated to include the time and spatial dependent lifetime sink produced by electron impact ionization as the plasma torus oscillates about the satellite plane, while simultaneously including the additional time dependence introduced by the action of solar radiation pressure on the cloud. Very preliminary model results are discussed and continuing progress in analysis of the peculiar directional features of the sodium cloud is also reported. Significant proress was made in developing a model for the Io potassium cloud and differences anticipated between the potassium and sodium cloud are described. An effort to understand the hydrogen atmosphere associated with Saturn's rings was initiated and preliminary results of a very and study are summarized. M.G.

N83-11006*# National Aeronautics and Space Administration, Washington, D. C.
ANOMALOUS TWILIGHTS RELATED TO THE TUNGUSSK METEORITE
I. T. Zotkin Apr. 1982 12 p refs Transl. into ENGLISH from Meteoritika (USSR), v. 29, 1969 p 170-176 Transl. into ENGLISH by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASw-3541)
(NASA-TM-76707; NAS 1.15:76707) Avail: NTIS HC A02/MF A01 CSCL 03B

Observations made of the night sky at the end of June and the beginning of July 1908 were surveyed. The phenomena observed were related to the fall of the Tungussk meteorite in Siberia at that time. The meteorite was not discovered until the 1920s and consequently, publications from the time of its actual fall had become scattered and difficult to find. The meteorite's connection with Encke's comet is discussed. Author

92 SOLAR PHYSICS

Includes solar activity, solar flares, solar radiation and sunspots.

N83-11007*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
STATIONARITY OF MAGNETOHYDRODYNAMIC FLUCTUATIONS IN THE SOLAR WIND
William H. Matthaeus and Melvyn L. Goldstein Jun. 1982 42 p refs Submitted for publication
(NASA-TM-83963; NAS 1.15:83963) Avail: NTIS HC A03/MF A01 CSCL 03B

Solar wind research and studies of charged particle propagation often assume that the interplanetary magnetic field represents a stationary random process. The extent to which ensemble averages of the solar wind magnetic fields follow the asymptotic behavior predicted by the ergodic theorem was investigated. Several time periods, including a span of nearly two years, are analyzed. Data intervals which span many solar rotations satisfy the conditions of weak stationarity if the effects of solar rotation are included in the asymptotic analysis. Shorter intervals which include a small integral number of interplanetary sectors also satisfy weak stationarity. The results are illustrated using magnetometer data from the ISEE-3, Voyager and IMP spacecraft. Author

N83-11008# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA. PART 2: COMPREHENSIVE REPORTS. DATA FOR AUGUST 1981
Helen E. Coffey, ed. Feb. 1982 76 p
(PB82-200932; NOAA-82040906-Pt-2; Rept-450-Pt-2) Avail: NTIS HC A05/MF A01 CSCL 03B

In addition to an index for 1981-82, data for August 1981 on solar radio emission, solar X-ray radiation and mass ejections from the Sun is given. Miscellaneous data includes active regions from 29 May to 22 July 1981, synoptic solar maps from 29 May to 22 July 1981, and energetic solar particles and plasma for May 1980. GRA

N83-11009# National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
SOLAR-GEOPHYSICAL DATA NUMBER 450, SUPPLEMENT. EXPLANATION OF DATA REPORTS
Helen E. Coffey, ed. Feb. 1982 87 p refs

(PB82-200940; NOAA-82040907; Rept-450-Suppl) Avail: NTIS HC A05/MF A01 CSCL 03B

This supplement describes and explains the data in the monthly publication Solar-Geophysical Data, which is intended to keep research workers informed on a timely schedule of the major events of solar activity and the associated interplanetary, ionospheric, radio propagation and other geophysical effects. This report series is made possible through the cooperation of many observatories, laboratories, and agencies as recorded in the detailed descriptions. The contents are: data for 1 month before month of publication; data for 2 months before month of publication; data for 6 months before month of publication; data for miscellaneous time periods, partial list of conributors; detailed data coverage for Solar-Geophysical Data; and Stonyhurst Disks. GRA

93 SPACE RADIATION

Includes cosmic radiation and inner and outer earth's radiation belts.

For biological effects of radiation see *52 Aerospace Medicine.* For theory see *73 Nuclear and High-Energy Physics.*

N83-11010*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

A STUDY OF THE DIFFUSE GALACTIC GAMMA RADIATION

Carl Fichtel and Donald Kniffen Aug. 1982 11 p refs Presented at the Intern. Workshop on Very High Energy Gamma Ray Astronomy, Ootacamund, India, 20-25 Sep. 1982

(NASA-TM-83992; NAS 1.15:83992) Avail: NTIS HC A02/MF A01 CSCL 03B

Assuming cosmic rays pervade the Galaxy, they necessarily produced high energy gamma-rays as they interact with the instellar matter and photons. The cosmic ray nucleon interactions five rise to gamma rays primarily through the decay of pi mesons, giving a unique spectrum with a maximum at approximately 68 MeV. Cosmic ray electrons produce gamma rays through bremsstrahlung, but with a markedly different energy spectral shape, one which decreases monotonically with energy. Cosmic ray electrons also interact with the interstellar starlight, optical and infrared photons, and the blackbody radiation through the Compton process. A model of galactic gamma ray production is discussed, and the predicted spatial distribution and energy spectra are presented. Considering the uncertainty in the point source contributions, the agreement between the theoretical predictions and the gamma ray data seems quite reasonable. Author

N83-11011*# National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.

ON THE ORIGIN OF RELATIVISTIC PARTICLES AND GAMMA-RAYS IN QUASARS

R. J. Protheroe and D. Kazanas Aug. 1982 18 p refs Submitted for publication

(NASA-TM-83983; NAS 1.15:83983) Avail: NTIS HC A02/MF A01 CSCL 03B

A model for a class of quasars and active galactic nuclei is proposed in which a shock around a massive black hole randomizes the infall kinetic energy of spherically accreting matter producing a nonthermal spectrum of high energy protons. It is suggested that these protons are responsible for the secondary production (via proton decay) of the radio emitting high energy electrons and also of high energy gamma-rays (via proton decay and inverse Compton interactions of the electrons). The correlation between radio and gamma-ray emission implied by the model is in good agreement with observations of 3C273. Observation of the flux of high energy neutrinos from quasars may provide a test for the model. Author

N83-11012# Instituto de Pesquisas Espaciais, Sao Paulo (Brazil).

MEASUREMENT OF GAMMA RADIATION USING A SPARK CHAMBER CARRIED ON A STRATOSPHERIC BALLOON [MEDIDA DE RADIACAO GAMA, ATRAVES DE UMA CAMARA DE CENTELHAS COLOCADA A BORDO DE UM BALAO ESTRATOSFERICO]

Clovis M. E. Santo and K. R. Rao Jun. 1982 27 p refs In PORTUGUESE; ENGLISH summary Submitted for publication Sponsored in part by the National Fund for Scientific and Technological Development (FNDCT)

(INPE-2438-PRE/139) Avail: NTIS HC A03/MF A01

The diffuse component of gamma rays in the 15 to 75 Mev range arriving from near the galactic center was determined by using a digitized spark chamber which was launched aboard two balloons. In each flight the detector reached an altitude of 2,2 g/sq. cm. Based on these data, a diffuse gamma ray flux at energies of 21, 36, 52, 67 Mev respectively was obtained. These values give a power law spectrum with spectral index equal to -3,3. The dependence of this radiation with the galactic latitude and longitude was also obtained. S.L.

99 GENERAL

N83-11013# Science Council of Japan, Tokyo.

SPACE RESEARCH IN JAPAN, 1982

Apr. 1982 73 p refs Presented to the 24th Meeting of the ICSU Comm. on Space Res., Ottawa, Ontario, 17 May - 2 Jun. 1982

Avail: NTIS HC A04/MF A01

The space science activities of Japan are reviewed. Satellite launches, sounding rockets, high altitude balloons, and meteorites are among the topics discussed. R.J.F.

N83-11014# Hungarian Academy of Sciences, Budapest. Hungarian National Committee on Space Research.

SPACE RESEARCH ACTIVITIES IN HUNGARY, 1980 - 1981

1982 28 p Presented at the 24th Plenary Meeting of COSPAR, Ottawa, Canada, May - Jun. 1982

Avail: NTIS HC A03/MF A01

The space research activities undertaken by Hungarian scientists since 1 January 1980 are summarized. The research covers the following fields: upper atmospheric research, satellite geodesy, meteorology, ionospheric and magnetospheric research, cosmic rays, interplanetary plasma, solar physics, remote sensing, and life sciences. L.F.M.

N83-11015# California Univ., Livermore. Lawrence Livermore Lab.

ENERGY AND TECHNOLOGY REVIEW, MARCH 1982

Mar. 1982 33 p refs

(DE82-012426; UCRL-52000-82-3) Avail: NTIS HC A03/MF A01

An instrument that measures the finish of optical surfaces was developed. Composite-material flywheels and containment systems are discussed. For individual titles, see N83-11016 through N83-11017.

N83-11016# California Univ., Livermore. Lawrence Livermore Lab.

MEASURING THE MICROTOPOGRAPHY OF OPTICAL SURFACES **c74**

G. M. Sanger *In its* Energy and Technol. Rev., Mar. 1980 Mar. 1982 p 1-8 refs (For primary document see N83-11015 01-99)

Avail: NTIS HC A03/MF A01

A laser-based heterodyne instrument that measures the microtopography of optical surfaces to a tenth of a nanometer in under ten minutes was developed. Author

N83-11017# California Univ., Livermore. Lawrence Livermore Lab.

COMPOSITE-MATERIAL FLYWHEELS AND CONTAINMENT SYSTEMS **c44**

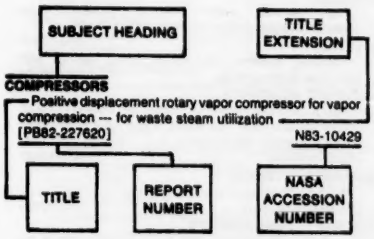
Satish V. Kulkarni *In its* Energy and Technol. Rev., Mar. 1982 Mar. 1982 p 18-29 (For primary document see N83-11015 01-99)

Avail: NTIS HC A03/MF A01

The development of composite-material flywheels and containment systems is reviewed. Author

SUBJECT INDEX

Typical Subject Index Listing



The subject heading is the key to the subject content of the document. Titles, report numbers, and accession numbers of pertinent documents are provided under each subject heading. When the title is insufficiently descriptive of the document content, a title extension has been added, separated from the title by three hyphens. The report number helps to indicate the type of document cited (e.g., NASA report, NASA translation, NASA contractor report). The NASA accession number is the number by which the document abstracts are arranged in this journal and by which the document is sold or requested. The titles, with title extensions if present, are arranged under each subject heading in ascending accession number order. The subject headings have been selected from the latest revision of the *NASA Thesaurus* (NASA SP-7051).

A

ABILITIES
Maintaining motor skill performance
[AD-A117349] N83-10781

ABIOGENESIS
Studies related to the deep earth gas
[PB82-227653] N83-10213

ABRASIVES
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings
[NASA-TM-82499] N83-10113

ABSORBERS (MATERIALS)
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309
A new type of EM wave absorbing coating
[AD-A117472] N83-10333

ABUNDANCE
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003

AC GENERATORS
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
Dish Stirling system integration and test progress report N83-10539

ACCELERATED LIFE TESTS
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205

ACCELERATION (PHYSICS)
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
High-powered pulsed-ion-beam acceleration and transport
[DE82-006879] N83-10694

ACCELEROMETERS
Earthquake strong-motion instrumentation at Lawrence Livermore National Laboratory
[DE82-012493] N83-10700

ACCEPTOR MATERIALS
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127
Low temperature photoluminescence studies of shallow electronic states in semiconductors N83-10959

ACCIDENT INVESTIGATION
Passenger car occupant ejection
[PB82-202409] N83-10993

ACCIDENT PREVENTION
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040

ACCUMULATORS
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322

ACCURACY
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284

ACETIC ACID
Membrane controlled anaerobic digestion N83-10497

ACETYLENE
Synthesis of perfluorinated polyethers — for sealers
[NASA-CR-166409] N83-10195

ACID RAIN
Meteorological assessment of SRM exhaust products' environmental impact
[NASA-CR-169453] N83-10648

ACOUSTIC EMISSION
Water release and mechanical failure in heated geologic salt
[DE82-012054] N83-10476
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887

ACOUSTIC IMPEDANCE
Utilizing numerical techniques in turbofan inlet acoustic suppressor design
[NASA-TM-82994] N83-10885

ACOUSTIC MEASUREMENT
Parameters for design of reverberant acoustic chambers for testing air-carried missiles N83-10235
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887

ACOUSTIC MICROSCOPES
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82986] N83-10555

ACOUSTIC PROPERTIES
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253

ACOUSTIC SCATTERING
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888

ACOUSTICS
Field injection electrostatic spraying of liquid hydrogen N83-10215
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309

ACTIVATED CARBON
Inductive heating of spent granular activated carbon
[PB82-218603] N83-10123

ACTIVATION ENERGY
Flames in straining flows — flame propagation N83-10136

ACTIVE CONTROL
Handling qualities of transports with advanced flight control systems N83-10061
The impact of active control on helicopter handling qualities N83-10066
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112
The experimental performance of an on-off active damper N83-10227

ACTUATORS
Low-authority control synthesis for large space structures
[NASA-CR-3495] N83-10441

ADDITIVES
Investigation of concrete mixtures incorporating hollow plastic microspheres
[PB82-198193] N83-10125
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153

ADHESION
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120

ADHESIVE BONDING
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120
A critical study of the role of the surface oxide layer in titanium bonding
[NASA-CR-169457] N83-10174
Surface analysis in composite bonding
[NASA-CR-169456] N83-10196

ADHESIVES
Tannin adhesives: From laboratory to industry
[PB82-206814] N83-10203

ADIABATIC CONDITIONS
Bifurcation and stability of propagating oscillation flames N83-10129
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] N83-10935

ADIABATIC EQUATIONS
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956

ADMIXTURES
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293

ADSORPTION
Studies of chemical adsorption using low energy electron diffraction N83-10130

ADVECTION
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680

AERIAL PHOTOGRAPHY
Aerial geologic log from Livermore, California to the Nevada Test Site, Nye County, Nevada
[DE82-018392] N83-10693

AERIAL RECONNAISSANCE
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
Near surface observations N83-10464
Weather constraints on airborne laser hydrography operations
[PB82-189754] N83-10745

AEROACOUSTICS
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888

AERODYNAMIC CHARACTERISTICS
Acta Aeronautica et Astronautica Sinica
[AD-A117465] N83-10003
Aerodynamic characteristics of maneuvering flaps N83-10004
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to traveling gust N83-10006
Design of the leading edge of a delta wing
[AD-A117469] N83-10036
The impact of active control on helicopter handling qualities N83-10066
Experience of non-linear high incidence aerodynamic characteristics N83-10070
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071

AERODYNAMIC COEFFICIENTS
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005

AERODYNAMIC DRAG
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020

AERODYNAMIC INTERFERENCE
Effect of control system delays on fighter flying qualities N83-10072

AERODYNAMIC STABILITY
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005

AERODYNAMIC STALLING
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018

AERODYNAMICS
Aeronautical Engineering. A continuing bibliography with indexes (supplement 151)
[NASA-SP-7037(151)] N83-10001
Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces
[NASA-TM-84490] N83-10017
Stability and control for high angle of attack maneuvering N83-10069

AEROELASTICITY
Aeroelastic stability analysis of a Darrieus wind turbine
[DE82-017001] N83-10603

AEROEMBOLISM
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 2: Detailed program descriptions, listings, examples and hardware specifications
[NASA-CR-167737] N83-10760

AERONAUTICAL ENGINEERING
Aeronautical Engineering. A continuing bibliography with indexes (supplement 151)
[NASA-SP-7037(151)] N83-10001
National Aeronautics and Space Administration N83-10989

AEROSOLS
In-situ aerodynamic sizing of aerosol particles with the SPART analyzer
[PB82-197195] N83-10412
Software system for reducing PAM-2 data
[NASA-CR-169458] N83-10684
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado
[PB82-215070] N83-10711

AEROSPACE ENGINEERING
Space research in Japan, 1982 N83-11013

AEROSPACE ENVIRONMENTS
Behavioral and biological interactions with small groups in confined microsocieties
[NASA-CR-169445] N83-10777

AEROSPACE MEDICINE
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804

AEROSPACE SYSTEMS
Space research in Japan, 1982 N83-11013

AFTERBURNING
Augmentor stability management program user's manual
[AD-A117749] N83-10136

AGGLOMERATION
Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1: Model formulation
[DE82-014836] N83-10212

AGGREGATES
Aggregate microtexture: Profile measurement and related frictional levels
[PB82-202565] N83-10124
An investigation of the effect of aggregate on concrete compressible strength
[PB82-212457] N83-10291

AGING (MATERIALS)
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204

AGRICULTURAL AIRCRAFT
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034

AGRICULTURE
Energy for agriculture in Pakistan
[IIASA-RR-82-20] N83-10499

AIR CONDITIONING
Conserving energy by improving the quality of the air purifying and air conditioning systems
[BMFT-FB-T-82-067] N83-10651

AIR CONDITIONING EQUIPMENT
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286

AIR FILTERS
Conserving energy by improving the quality of the air purifying and air conditioning systems
[BMFT-FB-T-82-067] N83-10651

AIR FLOW
Air motion in a two stroke diesel engine cylinder N83-10423

AIR JETS
Jet response to pure tone excitation
[UTIAS-TN-232] N83-10381

AIR LAND INTERACTIONS
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472

AIR POLLUTION
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492
Development of meteorological scenarios for air quality planning using mulivariate statistical analysis of meteorological and air quality data N83-10644
Compilation of air pollutant emission factors, supplement 12
[PB82-184722] N83-10654
Fugitive emission sources of organic compounds: Additional information on emissions, emission reductions, and costs
[PB82-217126] N83-10657
Health effects of welding fumes and gases
[DE82-012199] N83-10771

AIR PURIFICATION
Conserving energy by improving the quality of the air purifying and air conditioning systems
[BMFT-FB-T-82-067] N83-10651

AIR QUALITY
Development of meteorological scenarios for air quality planning using mulivariate statistical analysis of meteorological and air quality data N83-10644
Technology needs assessment of an atmospheric observation system for tropospheric research missions, part 1
[NASA-CR-3556] N83-10645
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2
[NASA-CR-3557] N83-10646
Review of the national ambient air quality standards for particulate matter: Assessment of scientific and technical information
[PB82-177874] N83-10670
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
Meteorology and air quality patterns in St. Louis RAPS Program, upper level analyses
[PB82-217522] N83-10729
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973

AIR TRAFFIC CONTROL
Techniques for air traffic planning and handling in the terminal area
[DFVLR-MITT-82-04] N83-10032
Airport and air traffic control system
[PB82-207606] N83-10033

AIRBORNE EQUIPMENT
Vibration qualification of equipment mounted in turboprop aircraft N83-10238
Airborne Flight Test System (AFTS)
[AD-A115100] N83-10330
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215138] N83-10707

AIRCRAFT
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness
[AD-A117745] N83-10041
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064

AIRCRAFT ACCIDENTS
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022

AIRCRAFT ANTENNAS
Analysis of airborne antenna patterns
[NASA-CR-169448] N83-10323

AIRCRAFT COMPARTMENTS
A combined hazard index fire test methodology for aircraft cabin materials, volume 1
[AD-A117448] N83-10025
A combined hazard index fire test methodology for aircraft cabin materials, volume 2
[AD-A117449] N83-10026

AIRCRAFT CONTROL
Criteria for Handling Qualities of Military Aircraft
[AGARD-CP-333] N83-10054
Handling qualities of transports with advanced flight control systems N83-10061
Bandwidth: A criterion for highly augmented airplanes N83-10063
Development of handling qualities testing in the 70's: A new direction N83-10077
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079

AIRCRAFT DESIGN
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034

AIRCRAFT ENGINES
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program
[NASA-CR-167943] N83-10970

AIRCRAFT EQUIPMENT
Vibration test level criteria for aircraft equipment N83-10240

AIRCRAFT FUELS
Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] N83-10207
Aviation turbine fuels: An assessment of alternatives
[NASA-CR-169395] N83-10214

AIRCRAFT GUIDANCE
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations
[NASA-CR-166274] N83-10029

AIRCRAFT LANDING
An analysis of airline landing flare data based on flight and training simulator measurements
[NASA-CR-166404] N83-10047
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
Effect of control system delays on fighter flying qualities N83-10073
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
Aircraft response to operations on rapidly repaired battle damaged runways and taxiways N83-10270
Two landings
[AD-A117466] N83-10783

AIRCRAFT MANEUVERS
Aerodynamic characteristics of maneuvering flaps N83-10004

AIRCRAFT MODELS
Laboratory modeling and analysis of aircraft-lightning interactions
[NASA-CR-169455] N83-10023
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272

AIRCRAFT NOISE
Holographic interferometry technique for rotary wing aerodynamics and noise [NASA-TM-84723] N83-10378
The Shock and Vibration Digest, volume 14, no. 8 [AD-A119004] N83-10433
Recent research on noise transmission into aircraft N83-10435
Flight effects of fan noise [NASA-CP-2242] N83-10883

AIRCRAFT PARTS
Acta Aeronautica et Astronautica Sinica [AD-A117465] N83-10003

AIRCRAFT PERFORMANCE
Present status of flying qualities criteria for conventional aircraft --- military specifications transfer functions N83-10055

AIRCRAFT SAFETY
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure [NASA-TP-2070] N83-10442

AIRCRAFT STABILITY
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results [NASA-TM-84258-PT-1] N83-10049
Digital calculation of the propagation in time of the aircraft gust response covariance matrix [VTH-LR-266] N83-10053

AIRCRAFT STRUCTURES
Analysis of subcritical response measurements from aircraft flutter tests N83-10269

AIRFOIL FENCES
Design of the leading edge of a delta wing [AD-A117469] N83-10036

AIRFOILS
Analysis of airfoil leading edge separation bubbles [NASA-CR-165935] N83-10018

AIRFRAME MATERIALS
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223

AIRGLOW
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10683

AIRLINE OPERATIONS
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982 [PB82-916408] N83-10022
Airport landside. Volume 1. Planning guide [AD-A117599] N83-10083
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide [AD-A117600] N83-10084
Airport landside. Volume 4. Appendix A. ALSIM AUXILIARY and MAIN programs [AD-A117602] N83-10086
Airport landside. Volume 5. Appendix B. ALSIM subroutines [AD-A117603] N83-10087

AIRPORT PLANNING
Airport landside. Volume 1. Planning guide [AD-A117599] N83-10083
Airport landside. Volume 3. ALSIM calibration and validation [AD-A117601] N83-10085

AIRPORTS
Airport and air traffic control system [PB82-207606] N83-10033
Airport landside. Volume 1. Planning guide [AD-A117599] N83-10083
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide [AD-A117600] N83-10084
Airport landside. Volume 3. ALSIM calibration and validation [AD-A117601] N83-10085
Airport landside. Volume 4. Appendix A. ALSIM AUXILIARY and MAIN programs [AD-A117602] N83-10086
Airport landside. Volume 5. Appendix B. ALSIM subroutines [AD-A117603] N83-10087

AIRSHIPS
JBFA-buoyant flight, special edition [NASA-TM-76814] N83-10002

ALBEDO
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory [DE82-006870] N83-10896

ALCOHOLS
Biomass fuels update. TVAs biomass fuels program [DE82-904990] N83-10613

ALGAE
Study of biofouling and its control in SRP cooling water systems [DE82-016299] N83-10752

ALGEBRA
KWIC index for numerical algebra [DE82-008144] N83-10790
Germ-Markov processes N83-10885

ALGORITHMS
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems [AD-D432842] N83-10253
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
Meteorology and air quality modeling in complex terrain: A literature review [PB82-200247] N83-10673
Inverse modeling system for analysis of seismic interfaces: INMOD [BMFT-FB-T-82-063] N83-10704
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns [PB82-215138] N83-10707
A graph theoretic algorithm for hierarchial decomposition of dynamic systems [DE82-013224] N83-10815
Matrix model of digital systems and its use in automatic test generation [DE82-017640] N83-10816
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide) [DE82-017351] N83-10825
Contributions to reduced order control theory N83-10846
Approximate solutions to queueing networks with state dependent parameters N83-10847
Should the extrapolated midpoint rule be smoothed [DE82-008488] N83-10858
Exploiting spatial and structural locality in geometric modelling [PB82-212937] N83-10863
Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems [DE82-007990] N83-10869
Comparative system model validation using four optimization algorithms [NIAST-81/124] N83-10877
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] N83-10957
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing [PB82-203100] N83-10974

ALKALINE BATTERIES
Polyvinyl alcohol membranes as alkaline battery separators [NASA-TM-82961] N83-10135

ALL-WEATHER AIR NAVIGATION
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations [NASA-CR-166274] N83-10029

ALTERNATING CURRENT
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] N83-10349

ALUMINUM
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings [NASA-TM-82499] N83-10113
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions [NASA-CR-3617] N83-10172
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] N83-10639
Grain-boundary segregation in aluminum-doped silicon carbide [DE82-015264] N83-10967

ALUMINUM ALLOYS
The effect of water displacing corrosion preventives on stress corrosion cracking of aluminium alloy 7075-T651 [ARL-MAT-NOTE-132] N83-10173

ALUMINUM BORON COMPOSITES
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates [NASA-CR-169462] N83-10449

ALUMINUM CHLORIDES
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment [PB82-194895] N83-10187
Aluminum chloride hexahydrate crystallization by HC1 gas sparging [PB82-177353] N83-10191

ALUMINUM COATINGS
Corrosion of architectural and structural metals and metal coatings in South Africa [PB82-185869] N83-10181
Analysis of vapor aluminum diffused stainless steels [PB82-202288] N83-10185

ALUMINUM GALLIUM ARSENIDES
Dynamic characteristics of aluminum gallium arsenide-gallium arsenide conventional and quantum well double heterostructure laser diodes N83-10419

ALUMINUM OXIDES
Friction and wear of iron and nickel in sodium hydroxide solutions [NASA-TM-82935] N83-10171

AMMONIA
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] N83-10639

AMORPHOUS SEMICONDUCTORS
Research and development on a MIS thin film solar cell made of amorphous silicon [BMFT-FB-T-82-079] N83-10620
Carrier transport in amorphous silicon utilizing picosecond photoconductivity N83-10960
Paramagnetic resonance studies of crystals N83-10965

AMPLIFIER DESIGN
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz [INPE-2463-PRE/155] N83-10326

AMPLITUDES
Low noise computationally efficient methods in digital signal processing N83-10318
Electromagnetic radiation from rock failure [PB82-177338] N83-10493

ANAEROBES
Membrane controlled anaerobic digestion N83-10497
Study of biofouling and its control in SRP cooling water systems [DE82-016299] N83-10752

ANALOG CIRCUITS
Fault diagnosis of nonlinear analog circuit. Volume 2: A multifrequency method for soft failure analysis [AD-A117568] N83-10358
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits [PB82-214067] N83-10374

ANALYSIS (MATHEMATICS)
On the maximal function for the Mehler kernel [CTH-MATH-1982-8] N83-10860
Arithmetical quadratic surfaces of Genus 0, 2 [CTH-MATH-1982-10] N83-10861

ANALYTICAL CHEMISTRY
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981 [PB82-197039] N83-10089

ANEMOMETERS
Simple anemometer for wind classification [BMFT-FB-T-82-106] N83-10719

ANGLE OF ATTACK
Stability and control for high angle of attack maneuvering N83-10069
Experience of non-linear high incidence aerodynamic characteristics N83-10070
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071
Calculations of asymmetric separated flow past circular cones at large angles of incidence [RAE-TM-AERO-1949] N83-10391

ANGLES (GEOMETRY)
Nonlocal effects of crack curving [AD-A118285] N83-10450

ANGULAR DISTRIBUTION
Electron bremsstrahlung angular-distribution fits for atomic numbers 1 or = to Z or = to 92 and incident-electron energies 1 kev or = to T or = to 500 keV [DE82-013388] N83-10890

ANISOTROPY
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma [DE82-019902] N83-10929
Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] N83-10933

ANNOTATIONS
Medical subject headings, Tree annotations, 1983 [PB82-208653] N83-10773

ANNUAL VARIATIONS
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
Photointerpretation of LANDSAT images N83-10462
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736

ANODES
Ion sputter textured graphite — anode collector plates in electron tube devices
[NASA-CASE-LEW-12919-1] N83-10117

ANODIZING
The electrical properties of the anodic oxide/GaAs interface N83-10356

ANOMALIES
A study of the anomalous thermal and wind patterns during early summer season of 1979 over the Afro-Asian region in relation to the large scale performance of the monsoon over India
[PB82-204611] N83-10724
Anomalous twilights related to the Tungussk Meteorite
[NASA-TM-76707] N83-11006

ANTENNA ARRAYS
Ultralow sidelobe planar near field measurement study
[AD-A117744] N83-10331

ANTENNA RADIATION PATTERNS
Self consistent loop antenna theory
[IPP-4/205] N83-10319
Analysis of airborne antenna patterns
[NASA-CR-169448] N83-10323
A generalized method for determining radiation patterns of aperture antennas and its application to reflector antennas
[NASA-CR-1694491 N83-10324

ANTENNAS
Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] N83-10933

ANTIMATTER
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996

ANTIRADAR COATINGS
A new type of EM wave absorbing coating
[AD-A117472] N83-10333

ANTIREFLECTION COATINGS
A new type of EM wave absorbing coating
[AD-A117472] N83-10333
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554

ANTITANK MISSILES
Antitank missiles night firing from Aerospatiale helicopters
[SNIAS-822-320-101] N83-10102

ANXIETY
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

APERTURES
A generalized method for determining radiation patterns of aperture antennas and its application to reflector antennas
[NASA-CR-169449] N83-10324

APPROACH CONTROL
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
Effect of control system delays on fighter flying qualities N83-10073

APPROACH INDICATORS
Predictor symbology in computer-generated pictorial displays
[NASA-CR-169441] N83-10803

APPROPRIATIONS
Making appropriations for the Department of Housing and Urban Development, and for sundry independent agencies, boards, commissions, corporations, and offices
[H-REPT-97-891] N83-10988
National Aeronautics and Space Administration N83-10989

APPROXIMATION
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
Approximate solutions to queueing networks with state dependent parameters N83-10847

AQUATIC PLANTS
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

AQUEOUS SOLUTIONS
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149

ARCHITECTURE
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296
Low maintenance building with inorganic materials
[PB82-206343] N83-10307
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309

ARIANE LAUNCH VEHICLE
Performance-cost analysis of a large program: The case of Ariane
[CNES-NT-103] N83-10100

AROMATIC COMPOUNDS
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127

ARTIFICIAL INTELLIGENCE
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-V0L-4] N83-10849

ARTIFICIAL SATELLITES
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098

ASHES
Ashing properties of coal blends N83-10572

ASTRONAUT PERFORMANCE
Behavioral and biological interactions with small groups in confined microsocieties
[NASA-CR-169445] N83-10777

ASTRONAUT TRAINING
Behavioral and biological interactions with small groups in confined microsocieties
[NASA-CR-169445] N83-10777

ASTRONAUTS
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-828] N83-10107

ASTRONOMICAL CATALOGS
Far infrared supplement: Catalog of infrared observations
[NASA-TM-84001] N83-10999

ASTROPHYSICS
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089

ASYMMETRY
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
Calculations of asymmetric separated flow past circular cones at large angles of incidence
[RAE-TM-AERO-1949] N83-10391
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776

ASYMPTOTIC METHODS
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254

ASYMPTOTIC SERIES
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870

ATLANTIC OCEAN
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681

ATMOSPHERIC ATTENUATION
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320

ATMOSPHERIC CIRCULATION
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472

ATMOSPHERIC COMPOSITION
Software system for reducing PAM-2 data
[NASA-CR-169458] N83-10684
Meteorology and air quality patterns in St. Louis RAPS Program, upper level analyses
[PB82-217522] N83-10729
Io: Escape and ionization of atmospheric gases
[NASA-CR-169443] N83-11004

ATMOSPHERIC EFFECTS
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320

ATMOSPHERIC MODELS
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
Other satellite atmospheres: Their nature and planetary interactions
[NASA-CR-169439] N83-11005

ATMOSPHERIC MOISTURE
Variability of water vapor flux in the northeast Brazil region
[INPE-2461-PRE/153] N83-10716

ATMOSPHERIC PHYSICS
The National Plan for Stratospheric Ozone Monitoring and Early Detection of Change, 1981 - 1986
[PB82-203159] N83-10706
USSR report: Earth sciences, no. 23
[JPRS-81965] N83-10713
Other satellite atmospheres: Their nature and planetary interactions
[NASA-CR-169439] N83-11005

ATMOSPHERIC PRESSURE
The sea level prediction model of the local AFOS MOS program
[PB82-215492] N83-10726

ATMOSPHERIC REFRACTION
Results of leveling refraction tests by the National Geodetic Survey
[PB82-193921] N83-10484

ATMOSPHERIC TEMPERATURE
A study of the anomalous thermal and wind patterns during early summer season of 1979 over the Afro-Asian region in relation to the large scale performance of the monsoon over India
[PB82-204611] N83-10724

ATMOSPHERIC TURBULENCE
Behavior of buoyant moist plumes in turbulent atmospheres
[PB82-180241] N83-10668

ATOMIC BEAMS
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415

ATOMIC COLLISIONS
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 2: User's guide
[PB82-187840] N83-10414
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415

ATOMIC STRUCTURE
Studies of chemical adsorption using low energy electron diffraction: N83-10130
Numerical calculation of the Thomas-Fermi-von Weizsacker function for an infinite atom without electron repulsion
[DE82-014123] N83-10893

ATROPHY
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749

ATTENUATION
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947

ATTITUDE (INCLINATION)
A point focusing collector for an integrated water/power complex N83-10541

ATTITUDE CONTROL
Piloted handling qualities design criteria for high order flight control systems N83-10058

Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-165979] N83-10110

AUDITORY PERCEPTION
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786

AUDITORY SIGNALS
Automatic audio signing. Volume 1: Executive summary
[PB82-202953] N83-10282
Automatic audio signing. Volume 2: Review, analysis and design
[PB82-202961] N83-10283

AUGER SPECTROSCOPY
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133

AUGMENTATION
Augmentor stability management program user's manual
[AD-A117749] N83-10138

AUSTENITE
Standard reference materials: A standard reference material containing nominally fifteen percent austenite (SRM 486)
[PB82-215559] N83-10147
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor
[BLL-CTO-2075-(9091.9F)] N83-10162

AUSTENITIC STAINLESS STEELS
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10165

AUTOCLAVING
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds N83-10132

AUTOMATA THEORY
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-V0L-4] N83-10849

AUTOMATIC CONTROL
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 2: User's guide
[PB82-187840] N83-10414
Low-authority control synthesis for large space structures
[NASA-CR-3495] N83-10441
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845

AUTOMATIC CONTROL VALVES
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424

AUTOMATIC FLIGHT CONTROL
Handling qualities criteria for longitudinal control N83-10062

AUTOMATIC PICTURE TRANSMISSION
TIROS-N series direct readout services users guide
[PB82-219023] N83-10728

AUTOMATION
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415

AUTOMOBILE ACCIDENTS
Passenger car occupant ejection
[PB82-202409] N83-10993

AUTOMOBILE ENGINES
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] N83-10430
Recent tests on the Carter small reciprocating steam engines N83-10536
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991

AUTOMOBILE FUELS
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] N83-10430

AUTOMOBILES
Investigation of the behavior of noise-sensitive electronic circuits for automotive applications with particular attention to MOS circuits
[PB82-211392] N83-10372
Garrett solar Brayton engine/generator status N83-10545

AVIONICS
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027

AXES OF ROTATION
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068

AXIAL FLOW TURBINES
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533

AXIAL LOADS
Rapid exact inelastic biaxial bending analysis
[PB82-196650] N83-10455

AZINES
Synthesis of perfluorinated polyethers --- for sealers
[NASA-CR-166409] N83-10195

B

BACKGROUND NOISE
Adaptive estimation of state noise in a Kalman filter
[INPE-2440-PRE/141] N83-10352

BACKGROUND RADIATION
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996

BALLOON FLIGHT
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002

BALLOON-BORNE INSTRUMENTS
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038

BALLOONS
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677

BANDWIDTH
Bandwidth: A criterion for highly augmented airplanes N83-10063
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316

BARIUM TITANATES
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567

BARYONS
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996

BASALT
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703

BATHS
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165

BATHYMETERS
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739

BATTERY CHARGERS
Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] N83-10502

BAYES THEOREM
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974

BAYS (TOPOGRAPHIC FEATURES)
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project
[PB82-215815] N83-10742

BEADS
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306

BEAM INJECTION
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] N83-10917

BEAM NEUTRALIZATION
High-powered pulsed-ion-beam acceleration and transport
[DE82-006879] N83-10894

BEAM WAVEGUIDES
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900

BEAMS (RADIATION)
Experimental investiation of neutral plasma beam propagation across a magnetic field
[AD-A117765] N83-10927

BEAMS (SUPPORTS)
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262
The Shock and Vibration Digest, volume 14, no. 8
[AD-A119004] N83-10433
Nonlinear analysis of beams. Part 1: A Survey of recent advances N83-10436

BEARINGS
Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings
[BMFT-FB-T-82-095] N83-10397

BEAUFORT SEA (NORTH AMERICA)
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736

BENDING
The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263
Rapid exact inelastic biaxial bending analysis
[PB82-196650] N83-10455

BENDING MOMENTS
Mathematical programming in plastic analysis N83-10444

BENEFICIATION
Fossil-energy
[DE82-018269] N83-10570
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574

BERING SEA
The eastern Bering Sea shelf: Oceanography and resources, volume 2
[PB82-181306] N83-10746

BERNSTEIN ENERGY PRINCIPLE
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939

BETA FACTOR
Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] N83-10945
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] N83-10952
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957

BETA PARTICLES
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma
[DE82-019902] N83-10929
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] N83-10952
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956

BIAS
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886

BIBLIOGRAPHIES
Aeronautical Engineering. A continuing bibliography with indexes (supplement 151)
[NASA-SP-7037(151)] N83-10001
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 1: Abstracts
[NASA-SP-7039(21)-SECT-1] N83-10978

NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 2: Abstracts
[NASA-SP-7039(21)-SECT-2] N83-10979

BIG BANG COSMOLOGY
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996

BINARY CODES
FORIG: A modification of the ORIGEN2 isotope-generation and depletion code for fusion problems
[DE82-016133] N83-10819
PLOTT: A graphics application package for production of publication-quality graphs
[DE82-015031] N83-10985

BINARY FLUIDS
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160

BIOASTRONAUTICS
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758

BIOCONVERSION
Membrane controlled anaerobic digestion N83-10497
Water hyacinth wastewater treatment system N83-10586
Landfill gas recovery: An analysis of results N83-10596
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

BIOELECTRICITY
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling
[RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling
[RR-187] N83-10754

BIOLOGICAL EFFECTS
Environmental Research Guiding Committee report
[PB82-220070] N83-10661
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758

BIOLOGICAL MODELS (MATHEMATICS)
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling
[RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling
[RR-187] N83-10754

BIOMASS ENERGY PRODUCTION
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

BIOMEDICAL DATA
Medical Physics Data Book
[PB82-217175] N83-10775

BIOPHYSICS
Medical Physics Data Book
[PB82-217175] N83-10775

BIOREACTORS
ANFLOW: Characterization and development of an energy conserving wastewater treatment system N83-10585

BISMUTH OXIDES
Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969

BISTABLE CIRCUITS
Studies of bistable optical devices
[AD-A117755] N83-10905

BITUMENS
Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] N83-10142
Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] N83-10503

BLACK BODY RADIATION
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010641] N83-10363
A blackbody radiation-pumped CO2 laser experiment
[NASA-TM-84541] N83-10420

BLANKETS (FISSION REACTORS)
Methods to enhance blanket power density
[DE82-017467] N83-10958

BLAST LOADS
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to traveling gust N83-10006
Evaluation Report: The Specialists' Meeting on Dynamic Environmental Qualification Techniques
[AGARD-AR-183] N83-10039

BLOOD
The development and evaluation of hemoglobin solution as a blood substitute
[AD-A117318] N83-10764

BLUNT LEADING EDGES
Design of the leading edge of a delta wing
[AD-A117469] N83-10036

BOATS
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650

BODY-WING AND TAIL CONFIGURATIONS
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to traveling gust N83-10006

BOEING 737 AIRCRAFT
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022

BOILERS
Sewage sludge as a supplementary utility boiler fuel N83-10590
Development of a solid waste fired fluidized boiler, phase 1 N83-10592

BOLTS
Friction-type bolted connections with A588 weathering steel
[PB82-203183] N83-10292

BONDING
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176

BONES
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments
[AD-A117464] N83-10765

BOOLEAN FUNCTIONS
Exploiting spatial and structural locality in geometric modelling
[PB82-212937] N83-10863

BOOSTER ROCKET ENGINES
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings
[NASA-TM-82499] N83-10113

BOREHOLES
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703
Kola superdeep hole N83-10714

BOUNDARY INTEGRAL METHOD
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445

BOUNDARY LAYER FLOW
New higher-order boundary-layer equations for laminar and turbulent flow past axisymmetric bodies
[AD-A117806] N83-10392

BOUNDARY LAYER SEPARATION
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018
Calculations of asymmetric separated flow past circular cones at large angles of incidence
[RAE-TM-AERO-1949] N83-10391

BOUNDARY LAYER STABILITY
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071

BOUNDARY LAYERS
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681

BOUNDARY VALUE PROBLEMS
What is stiffness?
[DE82-017639] N83-10854

BOX BEAMS
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276

BOXES (CONTAINERS)
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271

BRAYTON CYCLE
Garrett solar Brayton engine/generator status N83-10545
Application of the subatmospheric engine to solar thermal power N83-10546

BRAZIL
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678

BRAZING
Service evaluation of Aluminum-Brazed Titanium (ABTI) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172

BREATHING APPARATUS
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 2: Detailed program descriptions, listings, examples and hardware specifications
[NASA-CR-167737] N83-10760

BREEDER REACTORS
Demonstration Tokamak power plant study
[DE82-016182] N83-10937
Methods to enhance blanket power density
[DE82-017467] N83-10958

BREMSSTRAHLUNG
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
Electron bremsstrahlung angular-distribution fits for atomic numbers 1 or = to Z or = to 92 and incident-electron energies 1 kev or = to T or = to 500 keV
[DE82-013388] N83-10890
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] N83-10935

BRIDGES (STRUCTURES)
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293
Seismic design guidelines for highway bridges
[PB82-181611] N83-10301
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306

BRIGHTNESS TEMPERATURE
Other remote sensing systems: Retrospect and outlook N83-10467

BRINES
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968

BROADBAND
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493

BROADCASTING
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322

BUBBLE CHAMBERS
Stability and disturbance of large dc superconducting magnets
[DE82-012388] N83-10879

BUBBLES
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882

BUCKLING
Global analysis of problems from nonlinear thermoelasticity N83-10437

BUDGETING
The DOD-NASA independent research and development program: Issues and methodology for an in-depth study
[PB82-192741] N83-10977
BUFFETING
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052
BUILDINGS
Low maintenance building with inorganic materials
[PB82-206343] N83-10307
BUMPY TORUSES
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922
BUOYANCY
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002
Behavior of buoyant moist plumes in turbulent atmospheres
[PB82-180241] N83-10668
BUREAUS (ORGANIZATIONS)
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090
BURNING RATE
A laboratory approach to obtain suspension combustion data for reuse derived fuels N83-10579

C

CALDERAS
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690
CALIBRATING
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 2: User's guide
[PB82-187840] N83-10414
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610
Standard reference materials: Preparation and calibration of first surface aluminum mirror specular reflectance standards
[PB82-221367] N83-10909
CALIFORNIA
Geology of the Southeastern Livermore Valley, Alameda County, California
[DE82-012496] N83-10697
CALORIMETERS
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
CANCER
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789
CANOPIES
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492
CAPACITORS
The electrical properties of the anodic oxide/GaAs interface N83-10356
Protection of large capacitor banks
[DE82-017353] N83-10366
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] N83-10373
CAPACITY
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
CAPE KENNEDY LAUNCH COMPLEX
Atmospheric environment for Space Shuttle (STS-4) launch
[NASA-TM-82498] N83-10108
CARBON DIOXIDE
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
CARBON DIOXIDE LASERS
A blackbody radiation-pumped CO2 laser experiment
[NASA-TM-84541] N83-10420
CARBON FIBER REINFORCED PLASTICS
Surface analysis in composite bonding
[NASA-CR-169456] N83-10196
CARBON FIBERS
Lower-curing-temperature PMR polyimides
[NASA-TM-82958] N83-10118
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120
CARBON MONOXIDE
Studies of chemical adsorption using low energy electron diffraction N83-10130
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560
CARBONACEOUS ROCKS
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
CARBURETORS
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness
[AD-A117745] N83-10041
CARDIOVASCULAR SYSTEM
Cardiovascular adaptations during long-term altered gravity
[NASA-CR-169438] N83-10750
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory
[PB82-184029] N83-10774
CARRIER FREQUENCIES
Direct sequence spread spectrum communications: Applications to multiple access and jamming resistance N83-10328
AM receiver performance for 10 kHz signal spacings
[PB82-192576] N83-10342
CARRIER TRANSPORT (SOLID STATE)
Carrier transport in amorphous silicon utilizing picosecond photoconductivity N83-10960
CASCADE CONTROL
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
CASCADE FLOW
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
CAST ALLOYS
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor
[BLL-CTO-2075-(9091.9F)] N83-10162
CASTING
Forming techniques and procedures
[PB82-289002] N83-10298
CASTINGS
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180
CATALYSIS
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds N83-10132
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150
CATALYSTS
Role of tin catalysts in the hydroliquefaction of coal --- hydrocracking N83-10131
Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] N83-10146
CATALYTIC ACTIVITY
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
CATHODE RAY TUBES
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
CAVITATION FLOW
High temperature grain boundary cavitation in oxide dispersed copper N83-10168
CAVITIES
A study of the electromagnetic fields distribution inside buildings with apertures excited by an external source
[PB82-193418] N83-10341
CDC COMPUTERS
User's manual for DISPAK, an easy approach to DISSPLA graphics
[DE82-010902] N83-10829
CELESTIAL BODIES
Far infrared supplement: Catalog of infrared observations
[NASA-TM-84001] N83-10999
CELLS (BIOLOGY)
Electrophoresis device
[NASA-CASE-MFS-25426-1] N83-10126
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751
Ultrasound spectroscopy N83-10884
CEMENTS
Sulfate resistance of mortars using fly ash as a partial replacement for Portland cement
[PB82-208810] N83-10305
CENTRIFUGES
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574
CERAMIC BONDING
Interpretation of subcritical crack growth in ceramic materials
[DFVLR-FB-82-07] N83-10198
CERAMICS
Further industrial tests of ceramic thermal barrier coatings
[NASA-TP-2057] N83-10045
Interpretation of subcritical crack growth in ceramic materials
[DFVLR-FB-82-07] N83-10198
The metal-ceramic X-ray tube
[DRIC-T-6676] N83-10357
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543
Ceramic high temperature receiver design and tests N83-10544
Garrett solar Brayton engine/generator status N83-10545
CHANNELS (DATA TRANSMISSION)
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
AM receiver performance for 10 kHz signal spacings
[PB82-192576] N83-10342
CHARACTERIZATION
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona
[PB82-177965] N83-10158
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407
CHARGE EXCHANGE
Experiments on continuum electron capture in atomic hydrogen and collisional interactions of trapped ions
[DE82-013939] N83-10891
CHARGE TRANSFER
Charge-capture experiments for plasma ions and neutral atoms
[DE82-014502] N83-10954
CHARGED PARTICLES
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
CHARPY IMPACT TEST
The measurement of the cleavage fracture strength by means of an instrument impact test
[PB82-206806] N83-10183
CHARTS
Seismicity and active tectonics of the Andes and the origin of the Altiplano
[NASA-CR-169362] N83-10675
CHEMICAL ANALYSIS
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151
CHEMICAL CLEANING
Physicochemical cleaning and recovery of coal N83-10577
CHEMICAL COMPOSITION
Water chemistry of the Illinois waterway
[PB82-181108] N83-10672
The evolution of massive stars: The influence of initial composition and mass loss N83-11002

CHEMICAL EQUILIBRIUM
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193

CHEMICAL EXPLOSIONS
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations [BBC-RD-1982/16] N83-10313

CHEMICAL PROPERTIES
Use of organofluorine compounds [NRC/CNR-TT-2027] N83-10115
Features of the structure of large forge ingots made from steel with different impurity content [DRIC-T-6708] N83-10175

CHEMICAL REACTIONS
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering [PB82-216128] N83-10150
Flat-plate collector research area: Silicon material task N83-10519

CHEMICAL REACTORS
Thermal reactor — liquid silicon production from silane gas [NASA-CASE-NPO-14369-1] N83-10501

CHEMILUMINESCENCE
An introduction to chemiluminescence methods for lubricant oxidation studies [PB82-207515] N83-10199

CHIPS (ELECTRONICS)
Development of a single chip microprocessor in CMOS silicon gate technology. Further development of four bit microprocessor concept in CMOS technology [BMFT-FB-T-82-088] N83-10797

CHLOROCARBONS
Causes and effects of stratospheric ozone reduction: An update [PB82-209644] N83-10789

CHLOROPHYLLS
Analysis of high altitude remotely sensed data collected in the Nantucket Shoals experiment 4-15 May, 1981 [NASA-TM-84547] N83-10647

CHROMIUM STEELS
Features of the structure of large forge ingots made from steel with different impurity content [DRIC-T-6708] N83-10175

CHUCKCHI SEA
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas [AD-A116849] N83-10736

CIRCUIT BREAKERS
Phototransistor switch for breaker applications [DE82-904374] N83-10367

CIRCULAR CONES
Calculations of asymmetric separated flow past circular cones at large angles of incidence [RAE-TM-AERO-1949] N83-10391

CIRCULAR CYLINDERS
Turbulence effects on high Reynolds number flow past circular cylinders [PB82-176314] N83-10402

CIRCULAR PLATES
Global analysis of problems from nonlinear thermoelasticity N83-10437

CIRCULAR TUBES
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling [RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling [RR-187] N83-10754

CIRCULATORS (PHASE SHIFT CIRCUITS)
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz [INPE-2463-PRE/155] N83-10326

CITIES
Comparability for UHF television [PB82-218710] N83-10344
Energy recovery and cogeneration from an existing municipal incinerator N83-10589

CIVIL AVIATION
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness [AD-A117745] N83-10041

CLASSIFICATIONS
A combined optical/microwave approach to crop classification N83-10457
Some fundamental concepts in remote sensing N83-10459
Near surface observations N83-10464
Appendix B: Principles of computer processing of LANDSAT data N83-10470
Simple anemometer for wind classification [BMFT-FB-T-82-106] N83-10719

CLASSIFIERS
Dry processing of power plant coal rich in inerts — use of air classifier for dry upgrading of coal with high inerts content [BMFT-FB-T-82-101] N83-10631

CLEAN ENERGY
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard [PB82-183680] N83-10665

CLEAN FUELS
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard [PB82-183680] N83-10665

CLEANING
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings [NASA-TM-82499] N83-10113
Fossil-energy [DE82-018269] N83-10570
Physicochemical cleaning and recovery of coal N83-10577

CLEAR AIR TURBULENCE
CAT altitude avoidance system [NASA-CASE-NPO-15351-1] N83-10040

CLEAVAGE
The measurement of the cleavage fracture strength by means of an instrument impact test [PB82-206806] N83-10183

CLIMATOLOGY
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber [BMFT-FB-T-82-070] N83-10718

CLINICAL MEDICINE
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments [AD-A117464] N83-10765
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory [PB82-184029] N83-10774

CLIPPER CIRCUITS
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF) [INPE-2451-RPE/412] N83-10964

CLOSED CYCLES
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
Rippling modes in the edge of a Tokamak plasma [DE82-007724] N83-10940

CLOUD SEEDING
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1 [PB82-202805] N83-10721
FACE-1: The operational design and derivation of the basic and ancillary data sets [PB82-215104] N83-10727
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2 [PB82-216581] N83-10730

CLOUDS
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado [PB82-215070] N83-10711

CMOS
Development of an eight-bit microprocessor component family in CMOS technology — R and D in miniaturization of microprocessor components [BMFT-FB-T-82-089] N83-10796

COAL
Desulfurization of coal by means of the Batac-jig [BMFT-FB-T-82-100] N83-10145
High-temperature corrosion resistance of basic refractories to coal and lignite ash slags [PB82-201351] N83-10186
The heat capacity of coal chars N83-10206
Computer modeling of mixing and aggloreration in coal-conversion reactors. Volume 1: Model formulation [DE82-014836] N83-10212
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders [BMFT-FB-T-82-102] N83-10428
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres [PB82-221359] N83-10481
Resource targets for advanced underground coal extraction systems [NASA-CR-169429] N83-10503
Fossil-energy [DE82-018269] N83-10570
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571
Ashing properties of coal blends N83-10572
Coal preparation and testing N83-10573
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574
A systematic investigation of the organosulfur components in coal N83-10575
Microstructure of coal N83-10576
Physicochemical cleaning and recovery of coal N83-10577
Pneumatic stowing with lateral discharge in coal faces with thick seams [BMFT-FB-T-82-074] N83-10617
Dry processing of power plant coal rich in inerts — use of air classifier for dry upgrading of coal with high inerts content [BMFT-FB-T-82-101] N83-10631

COAL DERIVED GASES
Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] N83-10556
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels [NASA-TM-82985] N83-10557

COAL DERIVED LIQUIDS
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC [BLL-BG/MRS14580/82-(9022.048)] N83-10127
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds N83-10132
Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208

COAL GASIFICATION
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] N83-10140
Coal gasification of steam-soluted catalyst [BMFT-FB-T-82-073] N83-10143
Hard coal gasification using catalysts dissolved in steam [BMFT-FB-T-82-107] N83-10146
Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208
Steam gasification of coal, project prototype plant nuclear process heat: Report at the end of the reference phase [BMFT-FB-T-82-069] N83-10616
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification [BMFT-FB-T-82-098] N83-10625

COAL LIQUEFACTION
Role of tin catalysts in the hydroliquefaction of coal — hydrocracking N83-10131
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems [DE82-019043] N83-10140
Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] N83-10142
Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208

COASTAL ECOLOGY
The ecology of Southern California coastal salt marshes: A community profile [PB82-205717] N83-10655
The ecology of New England high salt marshes: A community profile [PB82-217118] N83-10658
The ecology of New England tidal flats: A community profile [PB82-217100] N83-10659

COASTAL WATER
Analysis of high altitude remotely sensed data collected in the Nantucket Shoals experiment 4-15 May, 1981 [NASA-TM-84547] N83-10647

COATING
Electrochemical studies of platinum-group metals in molten alkali metal cyanides [PB82-202243] N83-10190

COATINGS
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553
COBALT COMPOUNDS
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] N83-10159
COBOL
Validation summary report NCR Corporation V8570 VRX COBOL 30
[PB82-185554] N83-10798
Gould concept 32/87, COBOLT release 1.2
[PB82-182486] N83-10800
Gould concept 32/87, COBOL release 1.2
[PB82-182494] N83-10801
Burroughs Corporation large systems COBOL 74
[PB82-185547] N83-10844
CODES
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10857
CODING
Alternative electric generation impact simulator
[PB82-180324] N83-10302
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337
COEFFICIENT OF FRICTION
Determination of friction coefficients on several distant heat pipe sections with different sliding partners — static friction measurement of flat bearings
[BMFT-FB-T-82-095] N83-10397
Testing of slipperiness: Forces applied to the floor and movements of the foot in walking and in slipping on the heel
[PB82-204108] N83-10787
COGENERATION
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537
Small-scale waste-to-energy systems: A state-of-the-art report N83-10583
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
On the 40kW test power plant modification and development, phase 2
[PB82-216102] N83-10637
COLLIMATORS
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900
COLLISIONLESS PLASMAS
Kinetic theory of tearing modes N83-10911
COLOR
Some spectral and spatial characteristics of LANDSAT data N83-10461
COLOR TELEVISION
High quality decoding for PAL inputs to digital YUV studios
[BBC-RD-1982/12] N83-10308
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311
COLOR VISION
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test
[AD-A115052] N83-10769
Recommendations for color vision testing and criteria for its implementation at Sandia National Laboratories
[DE82-019826] N83-10772
COLORADO
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296
COLUMBIA RIVER BASIN (ID-OR-WA)
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488
COLUMNS (PROCESS ENGINEERING)
Orifice plate design studies for a multiple-compartment, ion-exchange column
[PB82-201310] N83-10155
COMBUSTION
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613
COMBUSTION CHAMBERS
Development of advanced high-temperature heat flux sensors
[NASA-CR-165618] N83-10044
Optimal design of multiple tube grain and their arrangement
[AD-A117545] N83-10362
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] N83-10559
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers
[PB82-184086] N83-10641
COMBUSTION EFFICIENCY
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] N83-10556
Sewage sludge as a supplementary utility boiler fuel N83-10590
COMBUSTION PHYSICS
Bifurcation and stability of propagating oscillation flames N83-10129
COMBUSTION STABILITY
Augmentor stability management program user's manual
[AD-A117749] N83-10138
COMBUSTION TEMPERATURE
Control of NO sub x by combustion process modifications
[PB82-180175] N83-10669
COMMERCIAL ENERGY
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] N83-10618
COMMUNICATION NETWORKS
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
Intercommunication between open networks
[PB82-205188] N83-10843
Research in space commercialization, technology transfer, and communications
[NASA-CR-169447] N83-10972
Investigations of interlibrary resource-sharing networks
[PB82-202417] N83-10987
COMMUNICATION SATELLITES
An informal discussion concerning geosynchronous communication satellites
[AD-A117546] N83-10099
Research in space commercialization, technology transfer, and communications
[NASA-CR-169447] N83-10972
COMMUNICATION THEORY
Utilization of the mathematical theory of communication in information sciences
[REPT-1982-ST-133] N83-10340
COMMUTATION
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] N83-10348
COMPATIBILITY
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
COMPILERS
Gould concept 32/87 FORTRAN 77+ release 3.0
[PB82-182700] N83-10792
Validation summary report NCR Corporation V8570 VRX COBOL 30
[PB82-185554] N83-10798
Gould concept 32/87, COBOLT release 1.2
[PB82-182486] N83-10800
Gould concept 32/87, COBOL release 1.2
[PB82-182494] N83-10801
Application of a floating point systems AP190L array processor to finite element analysis
[DE82-015239] N83-10831
Burroughs Corporation large systems COBOL 74
[PB82-185547] N83-10844
COMPLEX COMPOUNDS
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140
COMPLEX SYSTEMS
Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems
[DE82-007990] N83-10869
COMPLEX VARIABLES
A numerical investigation of some quadratic polynomials containing a high density of primes, part 1
[FOA-C-10195-M8] N83-10862
COMPOSITE MATERIALS
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
Composite-material flywheels and containment systems N83-11017
COMPOSITE STRUCTURES
Optimization of composite structures
[NASA-TM-84544] N83-10447
COMPOSTING
Proceedings of the conference on energy conservation. Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
COMPRESSED GAS
Voltage breakdown of spark gaps in compressed gases
[AD-A117467] N83-10359
COMPRESSIBLE FLOW
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82876] N83-10389
COMPRESSING
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
COMPRESSION LOADS
Program to predict performance of a gas gun
[DE82-007844] N83-10088
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271
COMPRESSIVE STRENGTH
A short note on the compressive behaviour of aramid fibre reinforced plastics
[VTH-LR-341] N83-10122
An investigation of the effect of aggregate on concrete compressible strength
[PB82-212457] N83-10291
COMPRESSOR BLADES
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
COMPRESSORS
Positive displacement rotary vapor compressor for vapor compression — for waste steam utilization
[PB82-227620] N83-10429
COMPUTATION
Programming languages for bit-serial array machines N83-10802
ODD user manual: The other data display
[DE82-013750] N83-10812
Survey of FORTRAN subroutines suitable for solving stiff oscillatory ordinary differential equations
[DE82-007790] N83-10824
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827
Some calculator programs for particle physics
[DE82-012362] N83-10895
COMPUTATIONAL FLUID DYNAMICS
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386
The numerical computation of three-dimensional turbulent boundary layers
[RAE-TM-AERO-1945] N83-10390
Calculations of asymmetric separated flow past circular cones at large angles of incidence
[RAE-TM-AERO-1949] N83-10391
COMPUTER AIDED DESIGN
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
Active Control of Space Structures (ACOSS) Eleven
[AD-A117596] N83-10111
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276
AGS-880 menu system user guide
[DE82-019955] N83-10793
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10808
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817
Powerful tool for design analysis of linear control systems
[DE82-015141] N83-10851
Description of the SNLA Automated Design Data System (ADDS)
[DE82-018347] N83-10982
COMPUTER DESIGN
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10276
COMPUTER GRAPHICS
Geographic information systems N83-10465
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10808
GRAF11: X-Y graph generation library
[DE82-016320] N83-10813

Functional specification of the Sandia Virtual Device Interface (SVDI)
[DE82-014522] N83-10818
ORION: An interactive post-processor for the analysis codes NIKE2D, DYNA2D, and TACO2D
[DE82-010710] N83-10822
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods
[DE82-013341] N83-10828
User's manual for DISPAK, an easy approach to DISSPLA graphics
[DE82-010902] N83-10829
Interactive language characteristics for a data dictionary system
[PB82-203696] N83-10837
COPLAN, an interactive system for project management
[INPE-2456-PRE/151] N83-10971
PLOTT: A graphics application package for production of publication-quality graphs
[DE82-015031] N83-10985
The Application of Traffic Simulation Models
[PB82-207226] N83-10992

COMPUTER NETWORKS
AGS-880 menu system user guide
[DE82-019955] N83-10793
Overview of the LINCS architecture
[DE82-010600] N83-10794
A suggested message structure standard for GILT
[FOA-C-10199-M6] N83-10835
Markov reliability models for repairable distributed systems N83-10839
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
Time-sharing comparisons of several computers
[DE82-014514] N83-10841
Casual User Project: Problems, proposed solutions, and implementation
[DE82-016407] N83-10842
Approximate solutions to queueing networks with state dependent parameters N83-10847
Comparative performance evaluation of database management systems
[DE82-010165] N83-10983

COMPUTER PROGRAM INTEGRITY
The cost of software fault tolerance
[NASA-TM-84546] N83-10806

COMPUTER PROGRAMMING
A rapidly recursive method for the B-splines N83-10015
Overview of the LINCS architecture
[DE82-010600] N83-10794
The cost of software fault tolerance
[NASA-TM-84546] N83-10806
Software Engineering, 7th Seminar
[AD-A117995] N83-10811
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817
Guidelines for technical reviews of software products
[DE82-013411] N83-10830
Six language extensions to enhance the portability of mathematical software written in PL/I: Background and justification
[DE82-017660] N83-10832
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Efficient FORTRAN programming practice
[RR-182] N83-10834

COMPUTER PROGRAMS
Airport landside. Volume 1. Planning guide
[AD-A117599] N83-10083
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide
[AD-A117600] N83-10084
Airport landside. Volume 3. ALSIM calibration and validation
[AD-A117601] N83-10085
Airport landside. Volume 4. Appendix A. ALSIM AUXILIARY and MAIN programs
[AD-A117602] N83-10086
Program to predict performance of a gas gun
[DE82-007644] N83-10088
Augmentor stability management program user's manual
[AD-A117749] N83-10138
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10278
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron
[DE82-012589] N83-10365
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface
[PB82-174384] N83-10375
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
WONDY V: A one-dimensional finite-difference wave-propagation code
[DE82-019807] N83-10396
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489
Human performance tests for repeated measurements: Alternate forms of eight tests by computer
[AD-A115021] N83-10784
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
Theory of testing computer programs N83-10805
The cost of software fault tolerance
[NASA-TM-84546] N83-10806
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807
A preprocessor system for finite element analysis
[AD-A117544] N83-10810
ODD user manual: The other data display
[DE82-013750] N83-10812
Functional specification of the Sandia Virtual Device Interface (SVDI)
[DE82-014522] N83-10818
ORION: An interactive post-processor for the analysis codes NIKE2D, DYNA2D, and TACO2D
[DE82-010710] N83-10822
Survey of FORTRAN subroutines suitable for solving stiff oscillatory ordinary differential equations
[DE82-007790] N83-10824
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods
[DE82-013341] N83-10828
Guidelines for technical reviews of software products
[DE82-013411] N83-10830
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Some calculator programs for particle physics
[DE82-012362] N83-10895
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936
Fusion reactor plasma-performance modeling: POPCON analysis
[DE82-016364] N83-10943
PLOTT: A graphics application package for production of publication-quality graphs
[DE82-015031] N83-10985

COMPUTER SYSTEMS PERFORMANCE
Time-sharing comparisons of several computers
[DE82-014514] N83-10841

COMPUTER SYSTEMS PROGRAMS
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
Gould concept 32/87 FORTRAN 77+ release 3.0
[PB82-182700] N83-10792
A suggested message structure standard for GILT
[FOA-C-10199-M6] N83-10835
Burroughs Corporation large systems COBOL 74
[PB82-185547] N83-10844

COMPUTER TECHNIQUES
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458
Computer processed LANDSAT data N83-10463
Appendix B: Principles of computer processing of LANDSAT data N83-10470
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Casual User Project: Problems, proposed solutions, and implementation
[DE82-016407] N83-10842

COMPUTER VISION
A review of three-dimensional vision for robotics
[AD-A118055] N83-10850

COMPUTERIZED SIMULATION
Airport landside. Volume 1. Planning guide
[AD-A117599] N83-10083
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide
[AD-A117600] N83-10084
Airport landside. Volume 3. ALSIM calibration and validation
[AD-A117601] N83-10085
Airport landside. Volume 4. Appendix A. ALSIM AUXILIARY and MAIN programs
[AD-A117602] N83-10086
Airport landside. Volume 5. Appendix B. ALSIM subroutines
[AD-A117603] N83-10087
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] N83-10629
Development of meteorological scenarios for air quality planning using mulivariate statistical analysis of meteorological and air quality data N83-10644
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
Predictor symbology in computer-generated pictorial displays
[NASA-CR-169441] N83-10803
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809
Data base simulator
[DE82-013342] N83-10821
Description of the Fokker-Plank code used to model ECRH of the Constance 2 plasma
[DE82-007912] N83-10950

COMPUTERS
Software tools and more for Modcomp computers
[DE82-007985] N83-10823

COMSTAR SATELLITES
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320

CONCENTRATORS
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator N83-10526
Acurex Parabolic Dish Concentrator (PDC-2) N83-10527
The PKI collector N83-10528
Thin film concentrator panel development N83-10529
A transmittance-optimized, point-focus Fresnel lens solar concentrator N83-10530
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] N83-10597

CONCRETES
Investigation of concrete mixtures incorporating hollow plastic microspheres
[PB82-198193] N83-10125
An investigation of the effect of aggregate on concrete compressible strength
[PB82-212457] N83-10291
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame
[AD-A117470] N83-10427

CONES
Arithmetical quadratic surfaces of Genus 0, 2
[CTH-MATH-1982-10] N83-10861

CONFERENCES
The Shock and Vibration Bulletin. Part 1: Keynote address, invited papers, damping and isolation, fluid-structure interaction
[AD-D432836] N83-10216
The Shock and Vibration Bulletin. Part 2: Environmental testing, shock testing, shock analysis
[AD-D432830] N83-10231
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop: Converting Waste to Energy
[DE82-014337] N83-10578
Seminar on Accelerated Hydroelectric Development in India: Proceedings, volume 1
[PB82-217753] N83-10634

Seminar on Accelerated Hydroelectric Development in India: Post session proceedings, volume 2
[PB82-217761] N83-10635
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers
[PB82-184086] N83-10641
Flight effects of fan noise
[NASA-CP-2242] N83-10883
US-Japan Workshop on Burning Plasma Physics and Engineering
[IPPJ-599] N83-10921
The Application of Traffic Simulation Models
[PB82-207226] N83-10992

CONGRESSIONAL REPORTS
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-828] N83-10107
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182882] N83-10747
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[MASAD-81-20] N83-10875
Making appropriations for the Department of Housing and Urban Development, and for sundry independent agencies, boards, commissions, corporations, and offices
[H-REPT-97-891] N83-10988
National Aeronautics and Space Administration N83-10989
Report to the Congress for 1981
[PB82-202862] N83-10994

CONICAL FLOW
Calculations of asymmetric separated flow past circular cones at large angles of incidence
[RAE-TM-AERO-1949] N83-10391

CONNECTORS
Friction-type bolted connections with A588 weathering steel
[PB82-203183] N83-10292

CONSERVATION
Copper Powder and Chemicals: Edited proceedings of a seminar
[PB82-206202] N83-10192

CONSERVATION EQUATIONS
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169

CONSERVATION LAWS
Conservatism in least favorable response analysis and testing N83-10241
High-resolution schemes for hyperbolic conservation laws
[NASA-CR-169381] N83-10856

CONSISTENCY
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311
Consistent guiding center drift theories
[IPP-6/212] N83-10914

CONSTRAINTS
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876

CONSTRUCTION
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296

CONSTRUCTION MATERIALS
Low maintenance building with inorganic materials
[PB82-206343] N83-10307

CONTAINMENT
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
Composite-material flywheels and containment systems N83-11017

CONTAMINANTS
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180
The ecology of New England high salt marshes: A community profile
[PB82-217118] N83-10658
Health effects of welding fumes and gases
[DE82-012199] N83-10771

CONTAMINATION
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752

CONTINENTAL SHELVES
The eastern Bering Sea shelf: Oceanography and resources, volume 2
[PB82-181306] N83-10746

CONTOURS
Some aspects of elastic bodies in contact N83-10439

CONTRACT MANAGEMENT
Performance-cost analysis of a large program: The case of Ariane
[CNES-NT-103] N83-10100
The DOD-NASA independent research and development program: Issues and methodology for an in-depth study
[PB82-192741] N83-10977

CONTRACT NEGOTIATION
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513

CONTRAST
Depth perception with yellow goggles
[NSMRL-960] N83-10759

CONTROL
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752
Powerful tool for design analysis of linear control systems
[DE82-015141] N83-10851
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932

CONTROL STABILITY
Gain and phase margin as a basis of longitudinal flying qualities evaluation --- fighter aircraft N83-10059
Robust stability of Smith predictor controllers for time-delay systems
[RR-179] N83-10852

CONTROL SURFACES
Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces
[NASA-TM-84490] N83-10017
Stability and control for high angle of attack maneuvering N83-10069

CONTROL THEORY
Advanced flight control design techniques and handling quality requirements N83-10075
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845
Contributions to reduced order control theory N83-10846
Robust stability of Smith predictor controllers for time-delay systems
[RR-179] N83-10852

CONTROLLABILITY
Criteria for Handling Qualities of Military Aircraft
[AGARD-CP-333] N83-10054
Present status of flying qualities criteria for conventional aircraft --- military specifications transfer functions N83-10055
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056
Equivalent systems criteria for handling qualities of military aircraft N83-10057
Piloted handling qualities design criteria for high order flight control systems N83-10058
Handling qualities of transports with advanced flight control systems N83-10061
Handling qualities criteria for longitudinal control N83-10062
Bandwidth: A criterion for highly augmented airplanes N83-10063
The status of military helicopter handling qualities criteria N83-10065
The impact of active control on helicopter handling qualities N83-10066
Operational criteria for the handling qualities of combat helicopters N83-10067
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068
Stability and control for high angle of attack maneuvering N83-10069
Experience of non-linear high incidence aerodynamic characteristics N83-10070
Effect of control system delays on fighter flying qualities N83-10073
Advanced flight control design techniques and handling quality requirements N83-10075
Development of handling qualities testing in the 70's: A new direction N83-10077
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079
Controllability, optimal control and receding horizon control of distributed multipass processes
[RR-181] N83-10853

CONTROLLED FUSION
Proposal to develop techniques using magneto-optic and electro-optic effects in optical fiber for CTR diagnostics
[DE82-009548] N83-10907

CONTROLLERS
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] N83-10348
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] N83-10349
Upsets in microprocessor controllers N83-10791

CONVECTION
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
Surface meteorological features associated with eastern Colorado severe convective storms
[PB82-203134] N83-10722

CONVECTIVE FLOW
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417
Improvements in CSQII: An improved numerical convection algorithm
[DE82-014264] N83-10820

CONVECTIVE HEAT TRANSFER
An experimental investigation of convective losses from solar receivers
[UILU-ENG-81-4003] N83-10500

CONVERGENCE
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870
Comparative system model validation using four optimization algorithms
[NIAST-81/124] N83-10877

COOLING
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness
[AD-A117745] N83-10041
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607

COOLING SYSTEMS
Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] N83-10369
Rotating gravity gradiometer study
[NASA-CR-169440] N83-10404
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015671] N83-10598
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752

COORDINATES
One dimensional multi-phase moving boundary problems with phases of different densities
[DE82-010324] N83-10395

COPOLYMERS
Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] N83-10135
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153

COPPER
Copper Powder and Chemicals: Edited proceedings of a seminar
[PB82-206202] N83-10192

COPPER ALLOYS
High temperature grain boundary cavitation in oxide dispersed copper N83-10168

CORE SAMPLING
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] N83-10705
Kola superdeep hole N83-10714

CORIOLIS EFFECT
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489

CORRECTION
Elevated duct data-base improvement
[PB82-215906] N83-10343

CORRELATION
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
CORROSION
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171
CORROSION PREVENTION
The effect of water displacing corrosion preventives on stress corrosion cracking of aluminium alloy 7075-T651
[ARL-MAT-NOTE-132] N83-10173
Corrosion of architectural and structural metals and metal coatings in South Africa
[PB82-185869] N83-10181
The use of thermi sprayed coatings to combat atmospheric corrosion in the building and construction industry
[PB82-185836] N83-10182
CORROSION RESISTANCE
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172
High-temperature corrosion resistance of basic refractories to coal and lignite ash slags
[PB82-201351] N83-10186
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment
[PB82-194895] N83-10187
High-efficiency commercial water heater development
[PB82-217514] N83-10290
CORROSION TESTS
High-efficiency commercial water heater development
[PB82-217514] N83-10290
CORRUGATED SHELLS
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271
CORRUGATING
Analysis of energy-absorbing shock mounts N83-10246
COSMIC RAYS
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996
A study of the diffuse galactic gamma radiation
[NASA-TM-83992] N83-11010
COST ANALYSIS
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662
The cost of software fault tolerance
[NASA-TM-84546] N83-10806
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
Should the extrapolated midpoint rule be smoothed
[DE82-008488] N83-10858
COST EFFECTIVENESS
Performance-cost analysis of a large program: The case of Ariane
[CNES-NT-103] N83-10100
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284
Some closing thoughts: Practical payoffs from satellite systems N83-10468
PV large systems project N83-10512
COST ESTIMATES
An economic evaluation of solar energy N83-10549
COUPLERS
Design of 3 dB hybrid couplers using juxtaposed strip lines in homogeneous dielectrics
[INPE-2453-PRE/149] N83-10353
COVARIANCE
Digital calculation of the propagation in time of the aircraft gust response covariance matrix
[VTH-LR-266] N83-10053
COVERINGS
Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] N83-10622
CRACK PROPAGATION
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007
Advanced residual strength degradation rate modeling for advanced composite structures
[AD-A115185] N83-10121
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166
Interpretation of subcritical crack growth in ceramic materials
[DFVLR-FB-82-07] N83-10198
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
Nonlocal effects of crack curving
[AD-A118285] N83-10450
Representation of cracks by dislocations and its application to the fracture toughness of metals
[GKSS-82/E/11] N83-10451
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887
CRACKING (FRACTURING)
Study of energy loss during a fracture event N83-10438
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage
[NASA-CR-169461] N83-10448
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates
[NASA-CR-169462] N83-10449
CRACKS
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169
Ray methods for inverse problems of elastic wave scattering N83-10315
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446
CRASHES
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442
CRASHWORTHINESS
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442
CRITERIA
Criteria for Handling Qualities of Military Aircraft
[AGARD-CP-333] N83-10054
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056
Equivalent systems criteria for handling qualities of military aircraft N83-10057
Handling qualities criteria for longitudinal control N83-10062
Bandwidth: A criterion for highly augmented airplanes N83-10063
CRITICAL TEMPERATURE
Central San Joaquin Valley type maps
[PB82-196064] N83-10733
CRITICAL VELOCITY
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
CROP GROWTH
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613
CROPS
A combined optical/microwave approach to crop classification N83-10457
CROSS COUPLING
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071
CROSSED FIELDS
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346
CROSSTALK
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
CRUCIBLES
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030
[NASA-TM-82497] N83-10094
CRUDE OIL
Studies related to the deep earth gas
[PB82-227653] N83-10213
Aviation turbine fuels: An assessment of alternatives
[NASA-CR-169395] N83-10214
CRUSTAL FRACTURES
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691
CRYOGENIC EQUIPMENT
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424
CRYOGENIC FLUIDS
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091
CRYOGENIC WIND TUNNELS
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980] N83-10081
Sensitivity analysis of cool-down strategies for a transonic cryogenic tunnel
[NASA-TM-84527] N83-10082
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407
CRYOSTATS
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980]. N83-10081
CRYSTAL DEFECTS
Studies of growth-in defects and transport properties versus growth parameters in III-V compound semiconductors
[AD-A117871] N83-10966
CRYSTAL GROWTH
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
Laser annealing of ion implanted silicon N83-10418
Large-area silicon sheet task N83-10520
Modeling of thin film GaAs growth
[NASA-CR-169366] N83-10963
Studies of growth-in defects and transport properties versus growth parameters in III-V compound semiconductors
[AD-A117871] N83-10966
CRYSTAL STRUCTURE
Features of the structure of large forge ingots made from steel with different impurity content
[DRIC-T-6708] N83-10175
Large-area silicon sheet task N83-10520
Paramagnetic resonance studies of crystals N83-10965
CRYSTALLINITY
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
CRYSTALLIZATION
Aluminum chloride hexahydrate crystallization by HC1 gas sparging
[PB82-177353] N83-10191
CUBIC EQUATIONS
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262
CUES
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786
CUMULATIVE DAMAGE
Dynamic response of the progressively damaging structures N83-10267
CUMULUS CLOUDS
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
FACE-1: The operational design and derivation of the basic and ancillary data sets
[PB82-215104] N83-10727
CURING
Lower-curing-temperature PMR polyimides
[NASA-TM-82958] N83-10118
CURRENT ALGEBRA
KWIC index for numerical algebra
[DE82-008144] N83-10790
CURRENT AMPLIFIERS
The plasma current multiplier
[UTIAS-256] N83-10923
CURRENT DENSITY
Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] N83-10502
CURVES (GEOMETRY)
Nonlocal effects of crack curving
[AD-A118285] N83-10450
CUTTERS
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606

CYANIDES
Improvements in heap leaching to recover silver and gold from low-grade resources
[PB82-193434] N83-10189
Electrochemical studies of platinum-group metals in molten alkali metal cyanides
[PB82-202243] N83-10190
CYCLES
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
Superposition of Markov renewal processes N83-10866
CYCLONES
A statistical dynamical model for prediction of tropical cyclone motion in the eastern north Pacific Ocean
[PB82-195298] N83-10732
CYCLOTRON RADIATION
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
CYCLOTRON RESONANCE DEVICES
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron
[DE82-012569] N83-10365
CYLINDRICAL BODIES
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program
[NASA-CR-167943] N83-10970
CYLINDRICAL CHAMBERS
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methonol iso-butanol gasoline fuel blends
[AD-A117746] N83-10426
CYLINDRICAL SHELLS
The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263
CZOCHRALSKI METHOD
Advanced Czohcralski ingot growth N83-10509

D

D REGION
The influence of the atmospheric ozone layer on the formation of layer D of the ionosphere at sunrise
[INPE-2487-PRE/171] N83-10679
D-558 AIRCRAFT
Flutter clearance of the horizontal tail of the Bellanca Skyrocket II airplane
[NASA-TM-84528] N83-10035
DAMAGE ASSESSMENT
Some aspects of elastic bodies in contact N83-10439
DAMPERS (VALVES)
The experimental performance of an on-off active damper N83-10227
DAMPING
Evaluation of new Iroquois torquemeter PN 73-30-1
[AD-A117747] N83-10042
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936
DAMPING TESTS
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
Effect of stiffener arrangement on the random response of a flat panel N83-10260
DATA ACQUISITION
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415
Remote sensing, a tool for managing the marine environment: Eight case studies
[PB82-220864] N83-10483
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
DATA BASE MANAGEMENT SYSTEMS
Elevated duct data-base improvement
[PB82-215906] N83-10343
A functional specification of the relational DBMS. I: Mandatory functions only
[PB82-182965] N83-10799
Data base simulator
[DE82-013342] N83-10821
Entity types and relationships (for a data dictionary system)
[PB82-203688] N83-10836
Entity types and relationships (for a data dictionary system), phase 1
[PB82-200403] N83-10838
Comparative performance evaluation of database management systems
[DE82-010165] N83-10983
DATA BASES
Geographic information systems N83-10465
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
Satellite observations of variations in Northern Hemisphere seasonal snow cover
[PB82-196668] N83-10734
Data base simulator
[DE82-013342] N83-10821
Entity types and relationships (for a data dictionary system), phase 1
[PB82-200403] N83-10838
Description of the SNLA Automated Design Data System (ADDS)
[DE82-018347] N83-10982
A logical database design framework
[PB82-203316] N83-10986
DATA COMPRESSION
A modified adaptive delta modulator for video data compression N83-10317
Elevated duct data-base improvement
[PB82-215906] N83-10343
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904
DATA CONVERSION ROUTINES
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
DATA LINKS
Intercommunication between open networks
[PB82-205188] N83-10843
DATA MANAGEMENT
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288
Elevated duct data-base improvement
[PB82-215906] N83-10343
Geographic information systems N83-10465
Description of the SNLA Automated Design Data System (ADDS)
[DE82-018347] N83-10982
DATA PROCESSING
Preliminary analysis of STS-4 entry flight data
[NASA-TM-81375] N83-10109
Appendix A: The LANDSAT system N83-10469
Appendix B: Principles of computer processing of LANDSAT data N83-10470
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
A preprocessor system for finite element analysis
[AD-A117544] N83-10810
DATA REDUCTION
A method for estimating the error induced by the Guyan Reduction N83-10256
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415
Computer processed LANDSAT data N83-10463
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
DATA SMOOTHING
Should the extrapolated midpoint rule be smoothed
[DE82-008488] N83-10858
DATA SYSTEMS
Appendix A: The LANDSAT system N83-10469
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
DATA TRANSMISSION
End-to-end imaging information rate advantages of various alternative communication systems
[NASA-CR-169428] N83-10321
TIROS-N series direct readout services users guide
[PB82-219023] N83-10726
Overview of the LINCS architecture
[DE82-010600] N83-10794
Intercommunication between open networks
[PB82-205188] N83-10843
DC 10 AIRCRAFT
An analysis of airline landing flare data based on flight and training simulator measurements
[NASA-CR-166404] N83-10047
DECAY
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736
DECISION MAKING
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785
DECODING
High quality decoding for PAL inputs to digital YUV studios
[BBC-RD-1982/12] N83-10308
DECOMPRESSION SICKNESS
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
DEEP SPACE
End-to-end imaging information rate advantages of various alternative communication systems
[NASA-CR-169428] N83-10321
DEFECTS
Dynamic response of the progressively damaging structures N83-10267
DEFLECTION
Lateral dynamics of C4 missile N83-10268
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information
[AD-A116819] N83-10685
DEFORMATION
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689
DEGENERATION
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749
DEGRADATION
Advanced residual strength degradation rate modeling for advanced composite structures
[AD-A115185] N83-10121
Environmental isolation task N83-10521
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962
DEGREES OF FREEDOM
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
Study of Guyan reduction of two degree of freedom systems N83-10255
A method for estimating the error induced by the Guyan Reduction N83-10256
DEHUMIDIFICATION
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
DEICERS
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022
DELTA LAUNCH VEHICLE
Mission operation report. RCA-E/Delta launch
[NASA-TM-84869] N83-10097
DELTA MODULATION
A modified adaptive delta modulator for video data compression N83-10317
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904

DELTA WINGS
Design of the leading edge of a delta wing
[AD-A117469] N83-10036
DEMODULATION
Modulation techniques
[NASA-CR-169460] N83-10329
DENDRITIC CRYSTALS
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
DENITROGENATION
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
DEOXIDIZING
The removal of non-metallic inclusions from steel
[BLL-M26519] N83-10164
DEOXYGENATION
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds N83-10132
DEPENDENCE
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133
DEPOSITION
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194
DEPTH
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133
DEPTH MEASUREMENT
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215136] N83-10707
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739
Depth perception with yellow goggles
[NSMRL-960] N83-10759
DESALINIZATION
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona
[PB82-177965] N83-10158
DESIGN ANALYSIS
An example of longitudinal and transversal oscillation coupling: The Epsilon aircraft cork screw N83-10074
Advanced flight control design techniques and handling quality requirements N83-10075
Active Control of Space Structures (ACOSS) Eleven
[AD-A117596] N83-10111
Rain fall data for the design of sewer pipe systems
[PB82-187212] N83-10299
System for broadcasting television by satellite
[INPE-2468-PRE/157] N83-10327
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
A logical database design framework
[PB82-203316] N83-10986
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991
DESIGN TO COST
Performance-cost analysis of a large program: The case of Ariane
[CNES-NT-103] N83-10100
DESORPTION
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152
DESULFURIZING
Desulfurization of coal by means of the Batac-jig
[BMFT-FB-T-82-100] N83-10145
Fossil-energy
[DE82-018269] N83-10570
A systematic investigation of the organosulfur components in coal N83-10575
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] N83-10629
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2
[BMFT-FB-T-82-108] N83-10652
DETECTION
Geophysical detection of groundwater
[AD-A117277] N83-10474
DETECTORS
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739
DEUTERIUM
Properties of Pt supported on oxides of titanium
[AD-A117892] N83-10139
Wildcat: A catalyzed D-D Tokamak reactor
[DE82-013712] N83-10938
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957
DIAGNOSIS
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test
[AD-A115052] N83-10769
Diagnostics for multiple-regression problems
[DE82-013629] N83-10795
DIAPHRAGMS (MECHANICS)
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing
[PB82-213679] N83-10274
DICTIONARIES
Entity types and relationships (for a data dictionary system)
[PB82-203688] N83-10836
Entity types and relationships (for a data dictionary system), phase 1
[PB82-200403] N83-10838
DIELECTRICS
Design of 3 dB hybrid couplers using juxtaposed strip lines in homogeneous dielectrics
[INPE-2453-PRE/149] N83-10353
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
Microwave oscillator stabilized by a dielectric resonator at 5.4 GHz
[INPE-2436-PRE/137] N83-10355
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] N83-10373
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751
DIES
Forming techniques and procedures
[PB82-289002] N83-10298
DIESEL ENGINES
Further industrial tests of ceramic thermal barrier coatings
[NASA-TP-2057] N83-10045
Air motion in a two stroke diesel engine cylinder N83-10423
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] N83-10430
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665
DIFFERENTIAL EQUATIONS
On nonlinear response of multiple blade systems N83-10261
Notes on the unsteady rectilinear motion of a perfect gas. Part 6: On a transformation of Staniukovich and its generalization
[VTH-LR-329] N83-10399
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445
Coupled near and far field thermal plume analysis using finite element techniques
[PB82-180316] N83-10667
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807
Survey of FORTRAN subroutines suitable for solving stiff oscillatory ordinary differential equations
[DE82-007790] N83-10824
What is stiffness?
[DE82-017639] N83-10854
Should the extrapolated midpoint rule be smoothed
[DE82-008488] N83-10858
Comparative system model validation using four optimization algorithms
[NIAST-81/124] N83-10877
Conditioning of matrices arising in the solution of stiff ODEs
[DE82-017641] N83-10878
DIFFERENTIAL GEOMETRY
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] N83-10928
DIFFUSE RADIATION
A study of the diffuse galactic gamma radiation
[NASA-TM-83992] N83-11010
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon
[INPE-2438-PRE/139] N83-11012
DIFFUSION
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967
DIFFUSION COEFFICIENT
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
DIGITAL DATA
Geographic information systems N83-10465
Appendix A: The LANDSAT system N83-10469
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709
Satellite observations of variations in Northern Hemisphere seasonal snow cover
[PB82-196668] N83-10734
DIGITAL FILTERS
An improved recursive formula for calculating shock response spectra N83-10251
Low noise computationally efficient methods in digital signal processing N83-10318
DIGITAL SYSTEMS
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101
High quality decoding for PAL inputs to digital YUV studios
[BBC-RD-1982/12] N83-10308
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
The Tricky-Fix signal processor N83-10347
Investigation of the behavior of noise-sensitive electronic circuits for automotive applications with particular attention to MOS circuits
[PB82-211392] N83-10372
Matrix model of digital systems and its use in automatic test generation
[DE82-017640] N83-10816
DIGITAL TECHNIQUES
Low noise computationally efficient methods in digital signal processing N83-10318
Modulation techniques
[NASA-CR-169460] N83-10329
The Tricky-Fix signal processor N83-10347
DILUTION
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
DIODES
RF characterization of semiconductors
[DE82-016995] N83-10335
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface
[PB82-174384] N83-10375
Dynamic characteristics of aluminum gallium arsenide-gallium arsenide conventional and quantum well double heterostructure laser diodes N83-10419
DIRECT CURRENT
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] N83-10348

DIRECT POWER GENERATORS
Stability and disturbance of large dc superconducting magnets
[DE82-012388] N83-10879
DIRECTIVITY
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900
DISLOCATIONS (MATERIALS)
Representation of cracks by dislocations and its application to the fracture toughness of metals
[GKSS-82/E/11] N83-10451
DISPERSING
Crustal and upper mantle velocity and Q of mainland China
[AD-A117030] N83-10687
DISPERSIONS
Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969
DISPLACEMENT
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008
Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] N83-10479
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703
DISPLACEMENT MEASUREMENT
Optimizing pre- and post-pulses for shaker shock testing N83-10232
The response spectrum method of solution for displacement excitation N83-10250
DISPLAY DEVICES
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results
[NASA-TM-84258-PT-1] N83-10049
Effect of control system delays on fighter flying qualities N83-10073
Predictor symbology in computer-generated pictorial displays
[NASA-CR-169441] N83-10803
DISSOLVED GASES
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757
DISTRIBUTED PARAMETER SYSTEMS
Advanced flight control design techniques and handling quality requirements N83-10075
Controllability, optimal control and receding horizon control of distributed multipass processes
[RR-181] N83-10853
DISTRIBUTED PROCESSING
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027
Markov reliability models for repairable distributed systems N83-10839
DISTRIBUTION (PROPERTY)
A study of the electromagnetic fields distribution inside buildings with apertures excited by an external source
[PB82-193418] N83-10341
DOCUMENTATION
Utilization of the mathematical theory of communication in information sciences
[REPT-1982-ST-133] N83-10340
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
DOMESTIC ENERGY
Running hot water: A systems approach to energy conservation
[FOA-C-10202-M2] N83-10628
Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] N83-10642
DONOR MATERIALS
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127
DOPES
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967
DOPPLER EFFECT
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] N83-10952
DOSIMETERS
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
DOWNLINKING
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325
DRAG REDUCTION
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020
Design of the leading edge of a delta wing
[AD-A117469] N83-10036
DRAINAGE
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720
DREDGED MATERIALS
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
Ocean dumping monitoring and research, January through December 1979
[PB82-176231] N83-10671
DRILLING
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] N83-10705
Kola superdeep hole N83-10714
DROP SIZE
A study of dropwise and film condensation under variable gravity fields N83-10385
In-situ aerodynamic sizing of aerosol particles with the SPART analyzer
[PB82-197195] N83-10412
DROPS (LIQUIDS)
Field injection electrostatic spraying of liquid hydrogen N83-10215
DROUGHT
Modification of Palmer drought index
[PB82-181751] N83-10731
DRY FRICTION
On nonlinear response of multiple blade systems N83-10261
DRYING APPARATUS
Dry processing of power plant coal rich in inerts — use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] N83-10631
DUALITY THEOREM
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
DUCTED BODIES
Elevated duct data-base improvement
[PB82-215906] N83-10343
DUCTS
High-resolution schemes for hyperbolic conservation laws
[NASA-CR-169381] N83-10856
DUMPING
Ocean dumping monitoring and research, January through December 1979
[PB82-176231] N83-10671
DUST
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492
DYE LASERS
Dye-laser development for plasma magnetic-field diagnostic
[DE82-016421] N83-10421
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado
[PB82-215070] N83-10711
Charge-capture experiments for plasma ions and neutral atoms
[DE82-014502] N83-10954
DYES
Solar energy conversion based on the principe of fluorescent collectors
[BMFT-FB-T-82-081] N83-10621
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
DYNAMIC CHARACTERISTICS
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051
The connectivity of polymer networks by neutron scattering and a statistical theory of hard rod neumatic fluids
[PB82-208554] N83-10202
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
DYNAMIC CONTROL
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815
DYNAMIC LOADS
Feasibility study for the surface impulse loading of structures using mild detonating fuze N83-10248
DYNAMIC MODELS
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428
A statistical dynamical model for prediction of tropical cyclone motion in the eastern north Pacific Ocean
[PB82-195298] N83-10732
DYNAMIC PROGRAMMING
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010
Powerful tool for design analysis of linear control systems
[DE82-015141] N83-10851
DYNAMIC RESPONSE
Digital calculation of the propagation in time of the aircraft gust response covariance matrix
[VTH-LR-266] N83-10053
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249
Effect of stiffener arrangement on the random response of a flat panel N83-10260
On nonlinear response of multiple blade systems N83-10261
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264
Dynamic response of the progressively damaging structures N83-10267
Analysis of subcritical response measurements from aircraft flutter tests N83-10269
Aircraft response to operations on rapidly repaired battle damaged runways and taxiways N83-10270
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] N83-10629
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786
DYNAMIC STABILITY
Stability and control for high angle of attack maneuvering N83-10069
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815
DYNAMIC STRUCTURAL ANALYSIS
A method for estimating the error induced by the Guyan Reduction N83-10256
Effective dynamic reanalysis of large structures N83-10259
Effect of stiffener arrangement on the random response of a flat panel N83-10260
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264
Transient response analysis of a large radar antenna N83-10265
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10278
DYNAMIC TESTS
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013

E

EARTH (PLANET)
The horizontal wire over Earth as a transmission line: A model surface-impedance approach
[AD-A117993] N83-10334

EARTH CRUST
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680
Crustal and upper mantle velocity and Q of mainland China
[AD-A117030] N83-10687
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688

EARTH MANTLE
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680
Crustal and upper mantle velocity and Q of mainland China
[AD-A117030] N83-10687

EARTH MOVEMENTS
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698

EARTH OBSERVATIONS (FROM SPACE)
Some closing thoughts: Practical payoffs from satellite systems N83-10468
Appendix C. LANDSAT: A worldwide perspective N83-10471

EARTH RESOURCES
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation
[PB82-183997] N83-10643

EARTH RESOURCES PROGRAM
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456

EARTH SURFACE
The horizontal wire over Earth as a transmission line: A model surface-impedance approach
[AD-A117993] N83-10334

EARTHQUAKE RESISTANCE
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287

EARTHQUAKE RESISTANT STRUCTURES
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing
[PB82-213679] N83-10274
Optimal design of seismic resistant planar steel frames
[PB82-220179] N83-10279
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane
[PB82-213687] N83-10281
Seismic design guidelines for highway bridges
[PB82-181611] N83-10301

EARTHQUAKES
Shaking table tests of a tubular steel frame model
[PB82-220161] N83-10277
Seismicity and active tectonics of the Andes and the origin of the Altiplano
[NASA-CR-169362] N83-10675
Seismic discrimination
[AD-A116884] N83-10686
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
Earthquake strong-motion instrumentation at Lawrence Livermore National Laboratory
[DE82-012493] N83-10700
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
Fault zones and seismicity in western Connecticut and southeastern New York
[PB82-215641] N83-10710

ECCENTRICS
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257

ECHO SOUNDING
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215138] N83-10707

ECONOMIC ANALYSIS
Commercialization of parabolic dish systems N83-10540
An economic evaluation of solar energy N83-10549
Panel discussions: Industrial support sector requirements N83-10550
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
Geothermal community heating for Cape Charles, Virginia
[PB82-184003] N83-10640
Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] N83-10642
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840

ECONOMICS
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294

EDITING ROUTINES (COMPUTERS)
SLAVE: A package of enhancements for the VAX/VMS EDT text editor
[DE82-019827] N83-10814

EDUCATION
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458

EFFICIENCY
High-efficiency commercial water heater development
[PB82-217514] N83-10290

EGYPT
Development of Egyptian instrumentation technology
[PB82-199845] N83-10411

EIGENVALUES
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide)
[DE82-017351] N83-10825
Contributions to reduced order control theory N83-10846

ELASTIC BODIES
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008
Some aspects of elastic bodies in contact N83-10439
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446

ELASTIC BUCKLING
The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263
Magnetoelastic instabilities and vibrations of superconducting-magnet systems
[DE82-015206] N83-10880

ELASTIC CYLINDERS
Sound propagation through liquids in viscoelastic circular cylinders N83-10230

ELASTIC DEFORMATION
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446

ELASTIC PROPERTIES
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262

ELASTIC SCATTERING
Ray methods for inverse problems of elastic wave scattering N83-10315

ELASTIC WAVES
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
Study of the propagation of waves generated by underwater explosions
[INPE-2391-TDL/086] N83-10382

ELASTOSTATICS
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446

ELECTRIC ARCS
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951

ELECTRIC BATTERIES
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] N83-10614

ELECTRIC CHARGE
Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] N83-10502

ELECTRIC CONTACTS
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554

ELECTRIC CURRENT
CS1: A two-dimensional finite element charge-sheet model of a short-channel MOS transistor
[PB82-205709] N83-10376

ELECTRIC DISCHARGES
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] N83-10619
The plasma current multiplier
[UTIAS-256] N83-10923
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951

ELECTRIC FIELDS
Singular perturbation aspects of kinetic equations N83-10913
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] N83-10952

ELECTRIC GENERATORS
Alternative electric generation impact simulator
[PB82-180324] N83-10302
Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] N83-10369
Garrett solar Brayton engine/generator status N83-10545
Technical and economical assessment on Tethered Wind-Energy Systems (TWES)
[DE82-017120] N83-10604

ELECTRIC MOTOR VEHICLES
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165601] N83-10348
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] N83-10349

ELECTRIC NETWORKS
Measurement studies of a 15 kW wind power plant --- data acquisition and economic evaluation of a 15 kW windmill
[BMFT-FB-T-82-109] N83-10633

ELECTRIC POTENTIAL
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] N83-10368
Configuration selection study for isolated loads using parabolic dish modules N83-10548
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607
Intermediate photovoltaic system application experiment operational performance. Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] N83-10608
Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] N83-10941

ELECTRIC POWER
Potential benefits from a successful solar thermal program N83-10547
Configuration selection study for isolated loads using parabolic dish modules N83-10548
Power conditioning subsystem design
[AD-A117736] N83-10569

ELECTRIC POWER PLANTS
Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] N83-10369
Reliability and safety of power systems --- mathematical models
[BMFT-FB-T-82-080] N83-10432

Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] N83-10498
Central-station applications: System and subsystem research activities N83-10511
PV large systems project N83-10512
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] N83-10627
Environmental Research Guiding Committee report
[PB82-220070] N83-10661

ELECTRIC POWER TRANSMISSION
Telecommunication in power systems using optical fibre cells
[BMFT-FB-T-82-082] N83-10336
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] N83-10368

ELECTRIC PULSES
Pulsed inductive thruster development (Advanced electric propulsion technology: High thrust). Volume 2. Supplement
[AD-A117797] N83-10114

ELECTRICAL FAULTS
Voltage breakdown of spark gaps in compressed gases
[AD-A117467] N83-10359

ELECTRICAL INSULATION
Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] N83-10370

ELECTRICAL PROPERTIES
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
The electrical properties of the anodic oxide/GaAs interface N83-10356

ELECTRICAL RESISTIVITY
Properties of Pt supported on oxides of titanium
[AD-A117892] N83-10139
Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] N83-10619
Singular perturbation aspects of kinetic equations N83-10913
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962

ELECTRO-OPTICS
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416

ELECTROCATALYSTS
Solar-assisted hydrogen generation by photoelectrocatalysis
[PB82-227612] N83-10161

ELECTROCHEMICAL CELLS
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558

ELECTROCHEMICAL CORROSION
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169

ELECTROCHEMISTRY
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] N83-10159

ELECTRODEPOSITION
Electrochemical studies of platinum-group metals in molten alkali metal cyanides
[PB82-202243] N83-10190

ELECTROLESS DEPOSITION
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177

ELECTROLYTES
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134

ELECTROMAGNETIC FIELDS
The horizontal wire over Earth as a transmission line: A model surface-impedance approach
[AD-A117993] N83-10334
A study of the electromagnetic fields distribution inside buildings with apertures excited by an external source
[PB82-193418] N83-10341

ELECTROMAGNETIC INTERFERENCE
Analysis of possible interference in radio altimeters induced by a position marker system called RASP
[NLR-TR-81135-U] N83-10043

ELECTROMAGNETIC PULSES
EDESS: An electromagnetically-driven explosive-shock simulator — generating explosive-like shocks in shipboard equipment N83-10245

ELECTROMAGNETIC RADIATION
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] N83-10908
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936

ELECTROMAGNETIC SCATTERING
Analysis of airborne antenna patterns
[NASA-CR-169448] N83-10323

ELECTROMAGNETIC SPECTRA
Some fundamental concepts in remote sensing N83-10459

ELECTROMAGNETIC WAVE FILTERS
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF)
[INPE-2451-RPE/412] N83-10964

ELECTROMAGNETIC WAVE TRANSMISSION
A new type of EM wave absorbing coating
[AD-A117472] N83-10333

ELECTRON ACCELERATORS
Photon induced reactions — future medium energy nuclear reactions
[BONN-HE-82-7] N83-10899
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931

ELECTRON BEAMS
A design study of the vacuum system of the Daresbury X-8 experimental line. Part 1: The front-end system
[MTG-17] N83-10275
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron
[DE82-012569] N83-10365
Introduction of an electron beam maskprinter system for LSI maskmaking
[BMFT-FB-T-82-110] N83-10371
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface
[PB82-174384] N83-10375
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam
[DE82-008441] N83-10944

ELECTRON BOMBARDMENT
Mechanical bonding of metal method
[NASA-CASE-LEW-12941-1] N83-10170

ELECTRON CAPTURE
Experiments on continuum electron capture in atomic hydrogen and collisional interactions of trapped ions
[DE82-013939] N83-10891

ELECTRON CYCLOTRON HEATING
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] N83-10934
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939
Unconventional heating experiments in EBT
[DE82-013373] N83-10948
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] N83-10949
Description of the Fokker-Plank code used to model ECRH of the Constance 2 plasma
[DE82-007912] N83-10950

ELECTRON DENSITY (CONCENTRATION)
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953

ELECTRON ENERGY
Numerical calculation of the Thomas-Fermi-von Weizsacker function for an infinite atom without electron repulsion
[DE82-014123] N83-10893
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma
[DE82-019902] N83-10929
Unconventional heating experiments in EBT
[DE82-013373] N83-10948
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] N83-10949
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956

ELECTRON GAS
Singular perturbation aspects of kinetic equations N83-10913

ELECTRON MICROSCOPY
Microstructure of coal N83-10576
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967

ELECTRON SCATTERING
Electron bremsstrahlung angular-distribution fits for atomic numbers 1 or = to Z or = to 92 and incident-electron energies 1 kev or = to T or = to 500 keV
[DE82-013388] N83-10890
Numerical calculation of the Thomas-Fermi-von Weizsacker function for an infinite atom without electron repulsion
[DE82-014123] N83-10893

ELECTRON SOURCES
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931

ELECTRON SPECTROSCOPY
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133

ELECTRON TUBES
Ion sputter textured graphite — anode collector plates in electron tube devices
[NASA-CASE-LEW-12919-1] N83-10117
The metal-ceramic X-ray tube
[DRIC-T-8676] N83-10357

ELECTRON TUNNELING
Paramagnetic resonance studies of crystals N83-10965

ELECTRONIC EQUIPMENT
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron
[DE82-012569] N83-10365
Protection of large capacitor banks
[DE82-017353] N83-10366

ELECTRONIC PACKAGING
Manufacturing techniques of large scale hybrid microelectronics
[AD-A117542] N83-10361

ELECTRONS
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
Paramagnetic resonance studies of crystals N83-10965

ELECTROPHORESIS
Electrophoresis device
[NASA-CASE-MFS-25426-1] N83-10126

ELECTROPOLISHING
High temperature grain boundary cavitation in oxide dispersed copper N83-10168

ELECTROSTATIC BONDING
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553

ELECTROSTATICS
Field injection electrostatic spraying of liquid hydrogen N83-10215
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface
[PB82-174384] N83-10375
CS1: A two-dimensional finite element charge-sheet model of a short-channel MOS transistor
[PB82-205709] N83-10376
Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] N83-10941

ELEMENTARY PARTICLE INTERACTIONS
Some calculator programs for particle physics
[DE82-012362] N83-10895

ELEVATION
Elevated duct data-base improvement
[PB82-215906] N83-10343

EMBRITTLEMENT
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204
EMERGENCIES
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973
EMISSION
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665
EMISSION SPECTRA
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10683
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997
ENCAPSULATING
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553
ENCLOSURES
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
ENDFIRE ARRAYS
End-fire hybrid array antennas
[AD-A117414] N83-10332
ENERGETIC PARTICLES
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003
ENERGY ABSORPTION
Analysis of energy-absorbing shock mounts N83-10246
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415
ENERGY CONSERVATION
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
Potential benefits from a successful solar thermal program N83-10547
ANFLOW: Characterization and development of an energy conserving wastewater treatment system N83-10585
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] N83-10618
Running hot water: A systems approach to energy conservation
[FOA-C-10202-M2] N83-10628
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973
ENERGY CONSUMPTION
Energy for agriculture in Pakistan
[IIASA-RR-82-20] N83-10499
Potential benefits from a successful solar thermal program N83-10547
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562
NECAP 4.1: NASA's Energy-Cost Analysis Program fast input manual and example
[NASA-TM-83241] N83-10566
ENERGY CONVERSION
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
Urban waste as a potential source for brick plants N83-10591
Conversion of municipal solid waste to energy, Jacksonville, Florida N83-10593
Technical and economical assessment on Tethered Wind-Energy Systems (TWES)
[DE82-017120] N83-10604
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation
[PB82-183997] N83-10643
ENERGY CONVERSION EFFICIENCY
Central-station applications: System and subsystem research activities N83-10511
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive N83-10517
Evaluation of advanced R and D topics in photovoltaics N83-10518
ENERGY DISSIPATION
Study of energy loss during a fracture event N83-10438
An experimental investigation of convective losses from solar receivers
[UILU-ENG-81-4003] N83-10500
Production and experimental study of the dissipative trapped ion instability N83-10910
Radial transport, end loss, and ambipolarity in tandem mirrors
[DE82-019546] N83-10955
ENERGY LEVELS
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892
ENERGY POLICY
Panel discussions: Industrial support sector requirements N83-10550
Solar thermal technologies benefits assessment: Objectives, methodologies and results for 1981
[NASA-CR-169373] N83-10551
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] N83-10618
Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] N83-10622
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built
[BMFT-FB-T-82-085] N83-10623
Tests with concentrating collectors --- construction, evaluation and qualification of parabolic solar absorbers
[BMFT-FB-T-82-104] N83-10626
Running hot water: A systems approach to energy conservation
[FOA-C-10202-M2] N83-10628
ENERGY REQUIREMENTS
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] N83-10618
ENERGY SOURCES
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015671] N83-10598
ENERGY SPECTRA
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003
ENERGY TECHNOLOGY
Alternative electric generation impact simulator
[PB82-180324] N83-10302
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
National photovoltaic program N83-10506
PV history: Lessons for the future N83-10514
Potential benefits from a successful solar thermal program N83-10547
Power conditioning subsystem design
[AD-A117736] N83-10569
Water hyacinth wastewater treatment system N83-10586
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] N83-10642
ENERGY TRANSFER
Inductive heating of spent granular activated carbon
[PB82-218603] N83-10123
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957
ENGINE CONTROL
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991
ENGINE DESIGN
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] N83-10568
ENGINE INLETS
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
ENGINE NOISE
Flight effects of fan noise
[NASA-CP-2242] N83-10883
ENGINE PARTS
Air motion in a two stroke diesel engine cylinder N83-10423
ENGINE TESTING LABORATORIES
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methonol iso-butanol gasoline fuel blends
[AD-A117746] N83-10426
ENGINE TESTS
Recent tests on the Carter small reciprocating steam engines N83-10536
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560
ENGINEERING DRAWINGS
Description of the SNLA Automated Design Data System (ADDS)
[DE82-018347] N83-10982
ENGINEERING MANAGEMENT
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090
ENGINES
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilow . stationary power applications
[NASA-CR-165274] N83-10568
ENVIRONMENT EFFECTS
Environmental isolation task N83-10521
Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] N83-10642
Meteorological assessment of SRM exhaust products' environmental impact
[NASA-CR-169453] N83-10648
The ecology of New England tidal flats: A community profile
[PB82-217100] N83-10659
ENVIRONMENT PROTECTION
A case study in the practical use of LANDSAT data N83-10466
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492
ENVIRONMENTAL MONITORING
Ocean pollution research, development and monitoring
[PB82-219049] N83-10740
ENVIRONMENTAL TESTS
The Shock and Vibration Bulletin. Part 2: Environmental testing, shock testing, shock analysis
[AD-D432830] N83-10231
Optimizing pre- and post-pulses for shaker shock testing N83-10232
Random impact vibration testor N83-10234
Development of a multiaxial force-pulse generator N83-10237
Vibration test level criteria for aircraft equipment N83-10240
Conservatism in least favorable response analysis and testing N83-10241
Dish Stirling system integration and test progress report N83-10539
ENZYMES
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200
EPITAXY
Studies of growth-in defect. and transport properties versus growth parameters in III-V compound semiconductors
[AD-A117871] N83-10966

EPOXY MATRIX COMPOSITES
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120

EQUATIONS OF MOTION
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020
New higher-order boundary-layer equations for laminar and turbulent flow past axisymmetric bodies
[AD-A117806] N83-10392

EQUATIONS OF STATE
Equation of state study for polar fluids
[PB82-214388] N83-10157
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160

EQUIPMENT SPECIFICATIONS
Necessary and sufficient qualification for shock N83-10220
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] N83-10504

EQUIVALENCE
Equivalent systems criteria for handling qualities of military aircraft N83-10057

EROSION
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951

ERROR ANALYSIS
Study of Guyan reduction of two degree of freedom systems N83-10255
A method for estimating the error induced by the Guyan Reduction N83-10256
Ultralow sidelobe planar near field measurement study
[AD-A117744] N83-10331
Signal analysis and error analysis studies for a Geopotential Research Mission (GRM)
[NASA-TM-83970] N83-10674
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886

ERROR DETECTION CODES
Automatic Repeat Query (ARQ), Forward Error Corrector (FEC), and hybrid protection systems
[DM51/BR-JP/0598-82] N83-10339

ERRORS
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
Results of leveling refraction tests by the National Geodetic Survey
[PB82-193921] N83-10484

ESTIMATES
Large sample theory of the Fisher-von-Mises distribution
[AD-A117515] N83-10872

ESTIMATING
Statistical estimation of liquid propellent rocket engine parameters N83-10011
A principal components approach to some multivariate estimation problems with incomplete data N83-10868

ESTUARIES
Vertical mixing and nutrient transport in the Chesapeake Bay
[PB82-178708] N83-10748

ETHYL ALCOHOL
Estimated capacity of US ethanol plants
[PB82-203647] N83-10154

EULER-LAGRANGE EQUATION
WONDY V: A one-dimensional finite-difference wave-propagation code
[DE82-019807] N83-10396

EUROPEAN AIRBUS
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076

EVALUATION
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090
Review of the national ambient air quality standards for particulate matter: Assessment of scientific and technical information
[PB82-177874] N83-10670
Guidelines for technical reviews of software products
[DE82-013411] N83-10830

EVAPORATION
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472

EVOLUTION (DEVELOPMENT)
Aerial geologic log from Livermore, California to the Nevada Test Site, Nye County, Nevada
[DE82-018392] N83-10693
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694

EXCITATION
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam
[DE82-008441] N83-10944

EXERCISE PHYSIOLOGY
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762

EXHAUST EMISSION
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] N83-10557
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] N83-10559
Meteorological assessment of SRM exhaust products' environmental impact
[NASA-CR-169453] N83-10648
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663

EXHAUST GASES
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] N83-10556
Compilation of air pollutant emission factors, supplement 12
[PB82-184722] N83-10654

EXHAUST SYSTEMS
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172

EXOBIOLOGY
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758

EXOSPHERE
Experimental investiation of neutral plasma beam propagation across a magnetic field
[AD-A117765] N83-10927

EXOTHERMIC REACTIONS
Exothermic furnace module development --- space processing
[NASA-TM-82500] N83-10093

EXPERIMENTAL DESIGN
Photon induced reactions --- future medium energy nuclear reactions
[BONN-HE-82-7] N83-10899
Demonstration Tokamak power plant study
[DE82-016182] N83-10937

EXPERIMENTATION
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] N83-10615
Low temperature photoluminescence studies of shallow electronic states in semiconductors N83-10959

EXPLOITATION
Improved roadheading by dinting behind the face line to full section
[BMFT-FB-T-82-087] N83-10478

EXPLORATION
Geophysical detection of groundwater
[AD-A117277] N83-10474

EXPLOSIONS
Feasibility study for the surface impulse loading of structures using mild detonating fuze N83-10248

EXPLOSIVES
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249

EXTERNAL STORES
Evaluation Report: The Specialists' Meeting on Dynamic Environmental Qualification Techniques
[AGARD-AR-183] N83-10039

EXTERNAL TANKS
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424

EXTINCTION
The peculiar extinction of Herschel 36
[NASA-TM-84893] N83-10998

EXTRACTION
Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] N83-10142

EXTRAGALACTIC RADIO SOURCES
Infrared properties of serendipitous X-ray quasars
[NASA-CR-169454] N83-10995

EXTRAPOLATION
Should the extrapolated midpoint rule be smoothed
[DE82-008488] N83-10858

EYE (ANATOMY)
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766

EYE PROTECTION
Depth perception with yellow goggles
[NSMRL-960] N83-10759

F

F REGION
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10683

F-106 AIRCRAFT
Laboratory modeling and analysis of aircraft-lightning interactions
[NASA-CR-169455] N83-10023

FABRICATION
High-efficiency commercial water heater development
[PB82-217514] N83-10290
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine
[NASA-CR-165962] N83-10379
Ceramic high temperature receiver design and tests N83-10544

FACTOR ANALYSIS
Individual differences and time-sharing ability: A critical review and analysis
[AD-A115082] N83-10776
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809

FAILURE
Protection of large capacitor banks
[DE82-017353] N83-10366

FAILURE ANALYSIS
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205
Fault diagnosis of nonlinear analog circuit. Volume 2: A multifrequency method for soft failure analysis
[AD-A117568] N83-10358
Some aspects of elastic bodies in contact N83-10439
Environmental isolation task N83-10521
Engineering sciences area and module performance and failure analysis area N83-10523

FAILURE MODES
A finite element model for failure initiation in shock loaded structural materials --- used in marine application N83-10252

FAN BLADES
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019

FAR INFRARED RADIATION
Far infrared supplement: Catalog of infrared observations
[NASA-TM-84001] N83-10999

FARADAY EFFECT
Proposal to develop techniques using magneto-optic and electro-optic effects in optical fiber for CTR diagnostics
[DE82-009548] N83-10907
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953

FARM CROPS
Central San Joaquin Valley type maps
[PB82-196084] N83-10733

FATIGUE LIFE
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266

FATIGUE TESTING MACHINES
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887

FATIGUE TESTS
Shock, vibration and fatigue in transportation industries N83-10233

FAULT TOLERANCE
Upsets in microprocessor controllers N83-10791

The cost of software fault tolerance
[NASA-TM-84546] N83-10806
Matrix model of digital systems and its use in automatic test generation
[DE82-017640] N83-10816
Markov reliability models for repairable distributed systems N83-10839

FEASIBILITY ANALYSIS
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas N83-10535
Panel discussions: Industrial support sector requirements N83-10550
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] N83-10568
Geothermal community heating for Cape Charles, Virginia
[PB82-184003] N83-10640

FEDERAL BUDGETS
National photovoltaic program N83-10506
Making appropriations for the Department of Housing and Urban Development, and for sundry independent agencies, boards, commissions, corporations, and offices
[H-REPT-97-891] N83-10988
National Aeronautics and Space Administration N83-10989

FEEDBACK CONTROL
An analysis of airline landing flare data based on flight and training simulator measurements
[NASA-CR-166404] N83-10047
Equivalent systems criteria for handling qualities of military aircraft N83-10057
Gain and phase margin as a basis of longitudinal flying qualities evaluation --- fighter aircraft N83-10059
Bandwidth: A criterion for highly augmented airplanes N83-10063
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076
Active Control of Space Structures (ACOSS) Eleven [AD-A117596] N83-10111
Pneumatic vibration control using active force generators N83-10226
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288
Contributions to reduced order control theory N83-10846
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932

FELDSPARS
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation
[BMFT-FB-T-82-096] N83-10144

FENCES (BARRIERS)
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300

FERMENTATION
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

FERRIC IONS
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment
[PB82-194895] N83-10187

FERRITIC STAINLESS STEELS
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185

FERROELECTRICITY
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567

FERROMAGNETIC MATERIALS
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF)
[INPE-2451-RPE/412] N83-10964

FERROMAGNETISM
Tricritical points and ising models on a hierarchical lattice N83-10961

FIBER COMPOSITES
Design simplification and cost reduction of helicopter tail rotor drive system by use of composites
[MBB-UD-348] N83-10037

FIBER OPTICS
A fibre-optic link for television outside broadcasts
[BBC-RD-1982/11] N83-10312
Telecommunication in power systems using optical fibre cells
[BMFT-FB-T-82-082] N83-10336
Proposal to develop techniques using magneto-optic and electro-optic effects in optical fiber for CTR diagnostics
[DE82-009548] N83-10907

FIBER ORIENTATION
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage
[NASA-CR-169461] N83-10448
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates
[NASA-CR-169462] N83-10449

FIBER REINFORCED COMPOSITES
On the vibration of fiber reinforced laminated plates N83-10009
A short note on the compressive behaviour of aramid fibre reinforced plastics
[VTH-LR-341] N83-10122

FIBERS
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176

FIELD STRENGTH
Coupled near and far field thermal plume analysis using finite element techniques
[PB82-180316] N83-10667

FIGHTER AIRCRAFT
Aerodynamic characteristics of maneuvering flaps N83-10004
Criteria for Handling Qualities of Military Aircraft [AGARD-CP-333] N83-10054
Gain and phase margin as a basis of longitudinal flying qualities evaluation --- fighter aircraft N83-10059
Effect of control system delays on fighter flying qualities N83-10072

FILM CONDENSATION
A study of dropwise and film condensation under variable gravity fields N83-10385

FILTRATION
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland N83-10581
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649

FINES
Physicochemical cleaning and recovery of coal N83-10577

FINITE DIFFERENCE THEORY
One dimensional multi-phase moving boundary problems with phases of different densities
[DE82-010324] N83-10395
WONDY V: A one-dimensional finite-difference wave-propagation code
[DE82-019807] N83-10396
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10857
Numerical solution of linear parabolic partial differential equation with infinite range for space variable
[PB82-188905] N83-10864

FINITE ELEMENT METHOD
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
Finite element analysis of viscoelastically damped sandwich structures N83-10225
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
A finite element model for failure initiation in shock loaded structural materials --- used in marine application N83-10252
Study of Guyan reduction of two degree of freedom systems N83-10255
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
Effective dynamic reanalysis of large structures N83-10259
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262
One dimensional multi-phase moving boundary problems with phases of different densities
[DE82-010324] N83-10395
Nonlinear analysis of beams. Part 1: A Survey of recent advances N83-10436
Coupled near and far field thermal plume analysis using finite element techniques
[PB82-180316] N83-10667
A preprocessor system for finite element analysis
[AD-A117544] N83-10810
ORION: An interactive post-processor for the analysis codes NIKE2D, DYNA2D, and TACO2D
[DE82-010710] N83-10822
Application of a floating point systems AP190L array processor to finite element analysis
[DE82-015239] N83-10831
Utilizing numerical techniques in turbofan inlet acoustic suppressor design
[NASA-TM-82994] N83-10885

FIRE PREVENTION
A combined hazard index fire test methodology for aircraft cabin materials, volume 1
[AD-A117448] N83-10025
A combined hazard index fire test methodology for aircraft cabin materials, volume 2
[AD-A117449] N83-10026

FIRES
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304

FLAME PROPAGATION
Bifurcation and stability of propagating oscillation flames N83-10129
Flames in straining flows --- flame propagation N83-10136

FLAME STABILITY
Bifurcation and stability of propagating oscillation flames N83-10129

FLAMMABILITY
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119
Flames in straining flows --- flame propagation N83-10136

FLAMMABLE GASES
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481

FLASH LAMPS
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010641] N83-10363
Dye-laser development for plasma magnetic-field diagnostic
[DE82-016421] N83-10421

FLASHING (VAPORIZING)
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149

FLAT PLATES
Effect of stiffener arrangement on the random response of a flat panel N83-10260
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
Block 5 module design summary N83-10510
Flat-plate collector research area: Silicon material task N83-10519
Large-area silicon sheet task N83-10520
Environmental isolation task N83-10521
Cell and module formation research area N83-10522
Engineering sciences area and module performance and failure analysis area N83-10523
Project analysis and integration area N83-10524

FLEXIBLE BODIES
Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] N83-10370

FLEXIBLE SPACECRAFT
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-165979] N83-10110

FLIGHT ALTITUDE
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040

FLIGHT CHARACTERISTICS
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051
Criteria for Handling Qualities of Military Aircraft [AGARD-CP-333] N83-10054
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056
Equivalent systems criteria for handling qualities of military aircraft N83-10057
Piloted handling qualities design criteria for high order flight control systems N83-10058
Gain and phase margin as a basis of longitudinal flying qualities evaluation --- fighter aircraft N83-10059
Fly by wire control: Towards new norms for judging flight qualities. An example: The Mirage 2000 N83-10060

Effect of control system delays on fighter flying qualities N83-10073
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
Simulation for predicting flying qualities N83-10080

FLIGHT CONTROL
The simulation study on a redundant flight control system N83-10014
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities [NASA-TM-84276] N83-10048
Present status of flying qualities criteria for conventional aircraft --- military specifications transfer functions N83-10055
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068
Effect of control system delays on fighter flying qualities N83-10072
Advanced flight control design techniques and handling quality requirements N83-10075
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076
Predictor symbology in computer-generated pictorial displays [NASA-CR-169441] N83-10803

FLIGHT INSTRUMENTS
Flight testing operations procedure [AD-A116984] N83-10030

FLIGHT PATHS
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064

FLIGHT SIMULATION
An analysis of airline landing flare data based on flight and training simulator measurements [NASA-CR-166404] N83-10047
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results [NASA-TM-84258-PT-1] N83-10049
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 2: Supporting data [NASA-TM-84258-PT-2] N83-10050
A mathematical model of a single main rotor helicopter for piloted simulation [NASA-TM-84281] N83-10051
Handling qualities of transports with advanced flight control systems N83-10061
Simulation for predicting flying qualities N83-10080

FLIGHT SIMULATORS
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback [AD-A117540] N83-10786

FLIGHT TESTS
Evaluation of new Iroquois torquemeter PN 73-30-1 [AD-A117747] N83-10042
An analysis of airline landing flare data based on flight and training simulator measurements [NASA-CR-166404] N83-10047
Development of handling qualities testing in the 70's: A new direction N83-10077
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
Simulation for predicting flying qualities N83-10080
Random impact vibration testor N83-10234

FLOATING POINT ARITHMETIC
Application of a floating point systems AP190L array processor to finite element analysis [DE82-015239] N83-10831

FLOOD CONTROL
State and local acquisition of floodplains and wetlands: A handbook on the use of acquisition in floodplain management [PB82-284805] N83-10664

FLOOD PLAINS
State and local acquisition of floodplains and wetlands: A handbook on the use of acquisition in floodplain management [PB82-284805] N83-10664

FLORIDA
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida [PB82-185141] N83-10490

FLOTATION
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation [BMFT-FB-T-82-096] N83-10144
First full-scale flotation plant in the USA for portable water treatment [PB82-220690] N83-10653

FLOW CHARACTERISTICS
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386

FLOW DISTRIBUTION
Programme system GANESI. Documentation report 1: Operating instructions [BLL-T5870/BGLRS/T586(9022.048)] N83-10377

FLOW EQUATIONS
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow [PB82-196700] N83-10400

FLOW GEOMETRY
Programme system GANESI. Documentation report 1: Operating instructions [BLL-T5870/BGLRS/T586(9022.048)] N83-10377

FLOW MEASUREMENT
Permeability of salt-crystal interfaces to brine [DE82-016580] N83-10968

FLOW RESISTANCE
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow [PB82-196700] N83-10400

FLOW VELOCITY
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030 [NASA-TM-82497] N83-10094
Investigating the possibility of combustion of a mass of sponge iron [M26521] N83-10128
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon [PB82-190356] N83-10491

FLOW VISUALIZATION
Holographic interferometry technique for rotary wing aerodynamics and noise [NASA-TM-84723] N83-10378

FLOWMETERS
Unsteady 2-phase flow instrumentation and measurement N83-10406

FLUE GASES
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2 [BMFT-FB-T-82-108] N83-10652

FLUID DYNAMICS
The Shock and Vibration Bulletin. Part 1: Keynote address, invited papers, damping and isolation, fluid-structure interaction [AD-D432836] N83-10216
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness [AD-A117543] N83-10393
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL [AGARD-AR-187] N83-10403
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction [NLR-MP-80011-U] N83-10888
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program [NASA-CR-167943] N83-10970

FLUID FLOW
High-resolution schemes for hyperbolic conservation laws [NASA-CR-169381] N83-10856

FLUID MECHANICS
High-resolution schemes for hyperbolic conservation laws [NASA-CR-169381] N83-10856
Tricritical points and ising models on a hierarchical lattice N83-10961

FLUIDIZED BED PROCESSORS
Investigation of extracts by fluidized bed extraction [BMFT-FB-T-82-068] N83-10142
Coal gasification of steam-soluted catalyst [BMFT-FB-T-82-073] N83-10143
Orifice plate design studies for a multiple-compartment, ion-exchange column [PB82-201310] N83-10155
Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1: Model formulation [DE82-014836] N83-10212
Development of a solid waste fired fluidized boiler, phase 1 N83-10592
Steam gasification of coal, project prototype plant nuclear process heat: Report at the end of the reference phase [BMFT-FB-T-82-069] N83-10616
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] N83-10623
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed [BMFT-FB-T-82-094] N83-10629

FLUORESCENCE
Solar energy conversion based on the principe of fluorescent collectors [BMFT-FB-T-82-081] N83-10621

FLUORIDES
Discharge pumped iodine monofluoride laser: Operating parameters and collisional kinetics N83-10901

FLUORINE ORGANIC COMPOUNDS
Use of organofluorine compounds [NRC/CNR-TT-2027] N83-10115

FLUOROCARBONS
Causes and effects of stratospheric ozone reduction: An update [PB82-209644] N83-10789

FLUOROPOLYMERS
Use of organofluorine compounds [NRC/CNR-TT-2027] N83-10115

FLUTTER
Flutter clearance of the horizontal tail of the Bellanca Skyrocket II airplane [NASA-TM-84528] N83-10035
Analysis of subcritical response measurements from aircraft flutter tests N83-10269
Aeroelastic stability analysis of a Darrieus wind turbine [DE82-017001] N83-10603

FLUTTER ANALYSIS
Analysis of subcritical response measurements from aircraft flutter tests N83-10269

FLUX (RATE)
Vacuum magnetic fields with dense flux surfaces [DE82-014989] N83-10881
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor [DE82-007195] N83-10947

FLUX DENSITY
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials [PB82-197344] N83-10373
Variability of water vapor flux in the northeast Brazil region [INPE-2461-PRE/153] N83-10716

FLY ASH
Sulfate resistance of mortars using fly ash as a partial replacement for Portland cement [PB82-208810] N83-10305
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574

FLY BY WIRE CONTROL
Piloted handling qualities design criteria for high order flight control systems N83-10058
Fly by wire control: Towards new norms for judging flight qualities. An example: The Mirage 2000 N83-10060
Antitank missiles night firing from Aerospatiale helicopters [SNIAS-822-320-101] N83-10102

FLYWHEELS
Energy and Technology Review, March 1982 [DE82-012426] N83-11015
Composite-material flywheels and containment systems N83-11017

FOCUSING
A point focusing collector for an integrated water/power complex N83-10541

FOKKER-PLANCK EQUATION
Description of the Fokker-Plank code used to model ECRH of the Constance 2 plasma [DE82-007912] N83-10950

FOOD PROCESSING
Migration of low molecular weight additives in polyolefins and copolymers [PB82-196403] N83-10153

FORCE DISTRIBUTION
Development of a multiaxial force-pulse generator N83-10237

FORECASTING
Energy for agriculture in Pakistan [IIASA-RR-82-20] N83-10499

FORGING
Seminar on heat treatment and metallurgical quality control of forgings [PB82-209438] N83-10184

FORMATIONS
Geology of the Las Vegas area [DE82-015871] N83-10692

FORMING TECHNIQUES
Forming techniques and procedures [PB82-289002] N83-10298

FORTRAN
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron [DE82-012569] N83-10365

Gould concept 32/87 FORTRAN 77+ release 3.0 [PB82-182700] N83-10792
ODD user manual: The other data display [DE82-013750] N83-10812
Survey of FORTRAN subroutines suitable for solving stiff oscillatory ordinary differential equations [DE82-007790] N83-10824
User's manual for DISPAK, an easy approach to DiSSPLA graphics [DE82-010902] N83-10829
Efficient FORTRAN programming practice [RR-182] N83-10834
PLOTT: A graphics application package for production of publication-quality graphs [DE82-015031] N83-10985

FORWARD SCATTERING
Ultrasound spectroscopy N83-10884

FOULING
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona [PB82-177965] N83-10158
Study of biofouling and its control in SRP cooling water systems [DE82-016299] N83-10752

FOUNDRIES
Compilation of air pollutant emission factors, supplement 12 [PB82-184722] N83-10654

FOURIER TRANSFORMATION
Laboratory modeling and analysis of aircraft-lightning interactions [NASA-CR-169455] N83-10023
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds [DE82-015855] N83-10116
Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242

FRACTIONATION
Electrophoresis device [NASA-CASE-MFS-25426-1] N83-10126

FRACTURE MECHANICS
Study of energy loss during a fracture event N83-10438
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage [NASA-CR-169461] N83-10448
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates [NASA-CR-169462] N83-10449
Nonlocal effects of crack curving [AD-A118285] N83-10450
A fracture mechanism map for pure iron [PB82-189150] N83-10454
Hydrologic test system for fracture flow studies in crystalline rock [DE82-016361] N83-10477

FRACTURE STRENGTH
The measurement of the cleavage fracture strength by means of an instrument impact test [PB82-206806] N83-10183
Representation of cracks by dislocations and its application to the fracture toughness of metals [GKSS-82/E/11] N83-10451

FRACTURING
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments [AD-A117464] N83-10765

FRAMES
DELIGHT.STRUCT: A computer-aided design environment for structural engineering [PB82-218496] N83-10278
Optimal design of seismic resistant planar steel frames [PB82-220179] N83-10279
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame [AD-A117470] N83-10427

FREE VIBRATION
On the vibration of fiber reinforced laminated plates N83-10009

FREEZING
A study of the in-situ indirect freezing process, volume 2 [PB82-200742] N83-10148
A study of the vacuum freezing high pressure ice-melting process, volume 1 [PB82-200734] N83-10149

FREQUENCIES
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224

FREQUENCY ASSIGNMENT
AM receiver performance for 10 kHz signal spacings [PB82-192576] N83-10342

FREQUENCY DISTRIBUTION
Advanced flight control design techniques and handling quality requirements N83-10075
Hydrometeorology of heavy rainstorms in selected Illinois basins [PB82-202292] N83-10723
Ultrasound spectroscopy N83-10884

FREQUENCY DIVISION MULTIPLE ACCESS
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes [NASA-CR-167931] N83-10325

FREQUENCY MODULATION
A fibre-optic link for television outside broadcasts [BBC-RD-1982/11] N83-10312

FRESNEL LENSES
A transmittance-optimized, point-focus Fresnel lens solar concentrator N83-10530
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] N83-10598

FRESNEL REFLECTORS
The PKI collector N83-10528

FRICTION
Friction and wear of iron and nickel in sodium hydroxide solutions [NASA-TM-82935] N83-10171
Plasma deposition and surface modification techniques for wear resistance [NASA-TM-82972] N83-10194

FROST DAMAGE
Investigation of concrete mixtures incorporating hollow plastic microspheres [PB82-198193] N83-10125
Central San Joaquin Valley type maps [PB82-196064] N83-10733

FUEL CELL POWER PLANTS
On the 40kW test power plant modification and development, phase 2 [PB82-216102] N83-10637

FUEL CELLS
Pore size engineering applied to starved electrochemical cells and batteries [NASA-TM-82893] N83-10134
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] N83-10639

FUEL COMBUSTION
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
Combustion of coal gas fuels in a staged combustor [NASA-TM-82987] N83-10556
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels [NASA-TM-82985] N83-10557
Multifuel evaluation of rich/quench/lean combustor [NASA-TM-82986] N83-10559
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built [BMFT-FB-T-82-085] N83-10623
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers [PB82-184086] N83-10641
Compilation of air pollutant emission factors, supplement 12 [PB82-184722] N83-10654

FUEL OILS
Control of NO sub x by combustion process modifications [PB82-180175] N83-10669

FUEL PRODUCTION
Estimated capacity of US ethanol plants [PB82-203647] N83-10154
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596

FUEL SYSTEMS
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness [AD-A117745] N83-10041
Automotive Stirling Engine Mod 1 Design Review, volume 2 [NASA-CR-167936] N83-10991

FUELS
An introduction to chemiluminescence methods for lubricant oxidation studies [PB82-207515] N83-10199
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels [NASA-TM-82998] N83-10560
Sewage sludge as a supplementary utility boiler fuel N83-10590
Biomass fuels update. TVAs biomass fuels program [DE82-904990] N83-10613

FUNCTION SPACE
Arithmetical quadratic surfaces of Genus 0, 2 [CTH-MATH-1982-10] N83-10861

FUNCTIONAL ANALYSIS
Flight testing operations procedure [AD-A116984] N83-10030

FURNACES
Exothermic furnace module development --- space processing [NASA-TM-82500] N83-10093
A laboratory approach to obtain suspension combustion data for reuse derived fuels N83-10579

FUSELAGES
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure [NASA-TP-2070] N83-10442

FUSION (MELTING)
Fossil-energy [DE82-018269] N83-10570
Ashing properties of coal blends N83-10572

FUSION REACTORS
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor [BLL-CTO-2075-(9091.9F)] N83-10162
FORIG: A modification of the ORIGEN2 isotope-generation and depletion code for fusion problems [DE82-016133] N83-10819
Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPPJ-602] N83-10917
US-Japan Workshop on Burning Plasma Physics and Engineering [IPPJ-599] N83-10921

G

GALACTIC NUCLEI
Infrared properties of serendipitous X-ray quasars [NASA-CR-169454] N83-10995

GALACTIC RADIATION
A study of the diffuse galactic gamma radiation [NASA-TM-83992] N83-11010
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon [INPE-2438-PRE/139] N83-11012

GALILEO PROJECT
Total-dose radiation effects data for semiconductor devices, volume 3 [NASA-CR-169430] N83-10350

GALLIUM ANTIMONIDES
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167

GALLIUM ARSENIDES
The electrical properties of the anodic oxide/GaAs interface N83-10356
Bioeffects data concerning the safe use of GaAs laser training devices [AD-A117810] N83-10766
Modeling of thin film GaAs growth [NASA-CR-169366] N83-10963
Studies of growth-in defects and transport properties versus growth parameters in III-V compound semiconductors [AD-A117871] N83-10966

GAMMA RAYS
Observational tests of Baryon symmetric cosmology [NASA-TM-84006] N83-10996
A study of the diffuse galactic gamma radiation [NASA-TM-83992] N83-11010
On the origin of relativistic particles and gamma-rays in quasars [NASA-TM-83983] N83-11011
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon [INPE-2438-PRE/139] N83-11012

GAS ANALYSIS
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic poliutants [PB82-206368] N83-10152

Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481

GAS BAGS
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002

GAS CHROMATOGRAPHY
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200

GAS DENSITY
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417

GAS DETECTORS
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152

GAS DISCHARGES
Voltage breakdown of spark gaps in compressed gases
[AD-A117467] N83-10359
The plasma current multiplier
[UTIAS-256] N83-10923

GAS DYNAMICS
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495

GAS FLOW
Programme system GANESI. Documentation report 1: Operating instructions
[BLL-T5870/BGLRS/T586(9022.048)] N83-10377
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580

GAS GUNS
Program to predict performance of a gas gun
[DE82-007644] N83-10088

GAS PRESSURE
Programme system GANESI. Documentation report 1: Operating instructions
[BLL-T5870/BGLRS/T586(9022.048)] N83-10377

GAS RECOVERY
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596
The development of a geopressured energy management information system in support of research planning, phase 1
[PB82-207366] N83-10638

GAS TURBINE ENGINES
Acta Aeronautica et Astronautica Sinica
[AD-A117465] N83-10003
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
Development of advanced high-temperature heat flux sensors
[NASA-CR-165618] N83-10044
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] N83-10559

GAS TURBINES
Garrett solar Brayton engine/generator status N83-10545
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560

GAS-METAL INTERACTIONS
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166

GASES
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751

GASIFICATION
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] N83-10615

GASOHOL (FUEL)
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613

GASOLINE
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methonol iso-butanol gasoline fuel blends
[AD-A117746] N83-10426
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665

GATES (CIRCUITS)
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
Development of a single chip microprocessor in CMOS silicon gate technology. Further development of four bit microprocessor concept in CMOS technology
[BMFT-FB-T-82-088] N83-10797
Matrix model of digital systems and its use in automatic test generation
[DE82-017640] N83-10816

GEARS
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10808

GENERAL AVIATION AIRCRAFT
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442

GEOCHEMISTRY
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694

GEODESY
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information
[AD-A116819] N83-10685
Space research activities in Hungary, 1980 - 1981 N83-11014

GEODETIC COORDINATES
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709

GEOGRAPHY
Geographic information systems N83-10465

GEOIDS
The determination of geoidal waves using spherical harmonics
[INPE-2399-TDL/087] N83-10676
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689

GEOLOGICAL FAULTS
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680
Geology of the Southeastern Livermore Valley, Alameda County, California
[DE82-012496] N83-10697
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
Magnetometric resistivity survey near Fortymile Wash, Nevada Test Site, Nevada
[DE82-016956] N83-10701
Fault zones and seismicity in western Connecticut and southeastern New York
[PB82-215641] N83-10710

GEOLOGICAL SURVEYS
Critical and strategic minerals in Alaska: Cobalt, the platinum-group metals and chromite
[PB82-193085] N83-10485
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691
Aerial geologic log from Livermore, California to the Nevada Test Site, Nye County, Nevada
[DE82-018392] N83-10693
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
Magnetometric resistivity survey near Fortymile Wash, Nevada Test Site, Nevada
[DE82-016956] N83-10701

GEOLOGY
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
Geology of the Las Vegas area
[DE82-015871] N83-10692
Geology of the Southeastern Livermore Valley, Alameda County, California
[DE82-012496] N83-10697

GEOMAGNETISM
Principal facts, accuracies, sources and base station descriptions for 4915 gravity stations on the San Bernadino 1 deg x 2 deg quadrangle, California
[PB82-200312] N83-10480
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487

GEOMETRIC RECTIFICATION (IMAGERY)
Familiarization with LANDSAT imagery N83-10460

GEOMETRICAL OPTICS
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936

GEOMETRICAL THEORY OF DIFFRACTION
Analysis of airborne antenna patterns
[NASA-CR-169448] N83-10323
A generalized method for determining radiation patterns of aperture antennas and its application to reflector antennas
[NASA-CR-169449] N83-10324

GEOMETRY
Exploiting spatial and structural locality in geometric modelling
[PB82-212937] N83-10663

GEOPHYSICS
Geophysical detection of groundwater
[AD-A117277] N83-10474
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694
USSR report: Earth sciences, no. 23
[JPRS-81965] N83-10713
Kola superdeep hole N83-10714
Solar-Geophysical Data Number 450, supplement. Explanation of data reports
[PB82-200940] N83-11009

GEOPOTENTIAL
Signal analysis and error analysis studies for a Geopotential Research Mission (GRM)
[NASA-TM-83970] N83-10674

GEOPRESSURE
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151
The development of a geopressured energy management information system in support of research planning, phase 1
[PB82-207366] N83-10638

GEOTHERMAL ENERGY UTILIZATION
Feasibility study of geothermal heating, Modoc Lassen housing project
[DE82-015099] N83-10611
Geothermal energy development in the United States
[PB82-215146] N83-10636
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory
[PB82-215054] N83-10639
Geothermal community heating for Cape Charles, Virginia
[PB82-184003] N83-10640
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation
[PB82-183997] N83-10643

GEOTHERMAL RESOURCES
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation
[PB82-183997] N83-10643

GERMANIUM ALLOYS
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
GERMANIUM OXIDES
Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969
GIBBS FREE ENERGY
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] N83-10159
GIMBALS
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
GIRDERS
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276
GLASS
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
GLASS COATINGS
Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] N83-10622
GLIDE PATHS
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
GOGGLES
Depth perception with yellow goggles
[NSMRL-960] N83-10759
GOLD
Improvements in heap leaching to recover silver and gold from low-grade resources
[PB82-193434] N83-10189
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
GOODNESS OF FIT
Fitting multidimensional splines using statistical variable selection techniques
[NASA-CR-169363] N83-10867
GOVERNMENT PROCUREMENT
The DOD-NASA independent research and development program: Issues and methodology for an in-depth study
[PB82-192741] N83-10977
GOVERNMENT/INDUSTRY RELATIONS
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513
GRAIN BOUNDARIES
High temperature grain boundary cavitation in oxide dispersed copper N83-10168
Large-area silicon sheet task N83-10520
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968
GRANULAR MATERIALS
Inductive heating of spent granular activated carbon
[PB82-218603] N83-10123
High-frequency ultrasonics: Non-destructive analysis of material structures
[BLL-RISLEY-TR-4166F-(9091.9F)] N83-10431
GRAPH THEORY
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815
GRAPHITE
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor
[BLL-CTO-2075-(9091.9F)] N83-10162
GRAPHITE-EPOXY COMPOSITES
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120
Advanced residual strength degradation rate modeling for advanced composite structures
[AD-A115185] N83-10121
GRAPHITE-POLYIMIDE COMPOSITES
Lower-curing-temperature PMR polyimides
[NASA-TM-82958] N83-10118
GRASSLANDS
A study of the structure of the wind over tropical savanna
[INPE-2412-TDL/092] N83-10715
GRATINGS (SPECTRA)
Synchrotron radiation to be used to generate holographic X-ray gratings
[DE82-008354] N83-10408
GRAVITATION
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487
GRAVITATIONAL EFFECTS
A study of dropwise and film condensation under variable gravity fields N83-10385
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386
Cardiovascular adaptations during long-term altered gravity
[NASA-CR-169438] N83-10750
GRAVITY ANOMALIES
Principal facts, accuracies, sources and base station descriptions for 4915 gravity stations on the San Bernadino 1 deg x 2 deg quadrangle, California
[PB82-200312] N83-10480
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information
[AD-A116819] N83-10685
GRAVITY GRADIENT SATELLITES
Passive stabilization of satellites by gravity gradient
[INPE-2462-PRE/154] N83-10096
GRAVITY WAVES
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
GRINDING (COMMINUTION)
A laboratory approach to obtain suspension combustion data for reuse derived fuels N83-10579
GROOVING
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma
[DE82-019902] N83-10929
GROUND BASED CONTROL
Techniques for air traffic planning and handling in the terminal area
[DFVLR-MITT-82-04] N83-10032
GROUND EFFECT
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
GROUND STATIONS
Principal facts, accuracies, sources and base station descriptions for 4915 gravity stations on the San Bernadino 1 deg x 2 deg quadrangle, California
[PB82-200312] N83-10480
GROUND TRUTH
Near surface observations N83-10464
GROUND WATER
Geophysical detection of groundwater
[AD-A117277] N83-10474
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon
[PB82-190356] N83-10491
Community heat-pump system, Klamath County, Oregon
[DE82-015106] N83-10600
Groundwater management: Discussion of issues. Report of the interstate Groundwater Task Force prepared by the US Water Resources Council
[PB82-181637] N83-10666
GROWTH
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736
GUNFIRE
Evaluation Report: The Specialists' Meeting on Dynamic Environmental Qualification Techniques
[AGARD-AR-183] N83-10039
GUST LOADS
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to traveling gust N83-10006
Digital calculation of the propagation in time of the aircraft gust response covariance matrix
[VTH-LR-266] N83-10053

H

HALO ORBIT SPACE STATION
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112
HAMSTERS
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751
HANDEDNESS
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776
HARMONIC ANALYSIS
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689
HARMONIC EXCITATION
On nonlinear response of multiple blade systems N83-10261
HAULING
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428
HAZARDS
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations
[BBC-RD-1982/16] N83-10313
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780
HEALTH PHYSICS
Health effects of low level radiation in shipyard workers
[DE82-001112] N83-10770
Health effects of welding fumes and gases
[DE82-012199] N83-10771
HEAT CAPACITY MAPPING MISSION
Post launch report on the heat capacity mapping mission
[NASA-TM-84859] N83-10095
HEAT EXCHANGERS
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543
Ceramic high temperature receiver design and tests N83-10544
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602
Steam gasification of coal, project prototype plant nuclear process heat: Report at the end of the reference phase
[BMFT-FB-T-82-069] N83-10616
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers
[PB82-184086] N83-10641
HEAT FLUX
Development of advanced high-temperature heat flux sensors
[NASA-CR-165618] N83-10044
HEAT MEASUREMENT
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304
Characterization of RDF properties through high pressure differential scenning calorimetry N83-10582
HEAT PIPES
Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine
[NASA-CR-165962] N83-10379
HEAT PUMPS
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] N83-10429
Application of the subatmospheric engine to solar thermal power N83-10546
Community heat-pump system, Klamath County, Oregon
[DE82-015106] N83-10600

HEAT SOURCES
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286

HEAT STORAGE
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] N83-10627

HEAT TRANSFER
A study of dropwise and film condensation under variable gravity fields N83-10385
Application of the Hughes-LIU algorithm to the 2-dimensional heat equation
[NASA-CR-3599] N83-10388
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752

HEAT TRANSMISSION
Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings
[BMFT-FB-T-82-095] N83-10397

HEAT TREATMENT
Seminar on heat treatment and metallurgical quality control of forgings
[PB82-209438] N83-10184

HEATERS
High-efficiency commercial water heater development
[PB82-217514] N83-10290

HEATING
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
Configuration selection study for isolated loads using parabolic dish modules N83-10548
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607

HEATING EQUIPMENT
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286

HEAVY IONS
Accelerator and fusion research division
[DE82-012361] N83-10930

HELICOPTER CONTROL
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results
[NASA-TM-84258-PT-1] N83-10049
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 2: Supporting data
[NASA-TM-84258-PT-2] N83-10050
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056

HELICOPTER DESIGN
Design simplification and cost reduction of helicopter tail rotor drive system by use of composites
[MBB-UD-348] N83-10037

HELICOPTER PERFORMANCE
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051

HELICOPTER PROPELLER DRIVE
Design simplification and cost reduction of helicopter tail rotor drive system by use of composites
[MBB-UD-348] N83-10037

HELICOPTER TAIL ROTORS
Design simplification and cost reduction of helicopter tail rotor drive system by use of composites
[MBB-UD-348] N83-10037

HELICOPTERS
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations
[NASA-CR-166274] N83-10029
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10066
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
Antitank missiles night firing from Aerospatiale helicopters
[SNIAS-822-320-101] N83-10102
Holographic interferometry technique for rotary wing aerodynamics and noise
[NASA-TM-84723] N83-10378
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425

HELITRONS
Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] N83-10945

HEMOGLOBIN
The development and evaluation of hemoglobin solution as a blood substitute
[AD-A117318] N83-10764

HERBIG-HARO OBJECTS
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997

HETERODYNING
Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer
[NASA-TM-83964] N83-10903
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
Measuring the microtopography of optical surfaces N83-11016

HETEROJUNCTION DEVICES
Dynamic characteristics of aluminum gallium arsenide-gallium arsenide conventional and quantum well double heterostructure laser diodes N83-10419

HIERARCHIES
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815

HIGH ALTITUDE BALLOONS
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002

HIGH ENERGY INTERACTIONS
Report of the subpanel on long-range planning for the US High-Energy-Physics Program of the High-Energy-Physics Advisory Panel
[DE82-012502] N83-10898
A study of the diffuse galactic gamma radiation
[NASA-TM-83992] N83-11010

HIGH FREQUENCIES
The experimental performance of an on-off active damper N83-10227

HIGH LEVEL LANGUAGES
Programming languages for bit-serial array machines N83-10802

HIGH PRESSURE
Improved roadheading by dinting behind the face line to full section
[BMFT-FB-T-82-087] N83-10478

HIGH TEMPERATURE
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543
Ceramic high temperature receiver design and tests N83-10544
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] N83-10627

HIGH TEMPERATURE TESTS
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119

HIGH VOLTAGES
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] N83-10368

HIGHWAYS
Aggregate microtexture: Profile measurement and related frictional levels
[PB82-202565] N83-10124
Automatic audio signing. Volume 1: Executive summary
[PB82-202953] N83-10282
Automatic audio signing. Volume 2: Review, analysis and design
[PB82-202961] N83-10283
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288
Pavement roughness and skid properties
[PB82-212309] N83-10295
Experiences in transportation system management
[PB82-181322] N83-10303
Two landings
[AD-A117466] N83-10783

HISTORIES
An approach to the limitation and control of shipboard vibration N83-10217

HODOGRAPHS
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386

HOLE DISTRIBUTION (MECHANICS)
The stress distribution around an infinite row of circular holes in an orthotropic plate
[VTH-LR-340] N83-10453

HOLE GEOMETRY (MECHANICS)
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452

HOLOGRAPHY
Synchrotron radiation to be used to generate holographic X-ray gratings
[DE82-008354] N83-10408

HOMOGENEITY
Stationarity of magnetohydrodynamic fluctuations in the solar wind
[NASA-TM-83963] N83-11007

HONEYCOMB STRUCTURES
Analysis of energy-absorbing shock mounts N83-10246
Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine
[NASA-CR-165962] N83-10379

HORIZONTAL ORIENTATION
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980] N83-10081
The horizontal wire over Earth as a tranemission line: A model surface-impedance approach
[AD-A117993] N83-10334

HORIZONTAL TAIL SURFACES
Flutter clearance of the horizontal tail of the Bellanca Skyrocket II airplane
[NASA-TM-84528] N83-10035

HOT PRESSING
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967

HOT-WIRE ANEMOMETERS
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407

HUMAN BODY
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761

HUMAN FACTORS ENGINEERING
Flight testing operations procedure
[AD-A116984] N83-10030
Operational criteria for the handling qualities of combat helicopters N83-10067
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492

HUMAN PERFORMANCE
Individual differences and time-sharing ability: A critical review and analysis
[AD-A115082] N83-10778
The use of dual task paradigms in memory research: A methodological assessment and an evaluation of effort as a measure of levels of processing
[AD-A115093] N83-10779
Maintaining motor skill performance
[AD-A117349] N83-10781
Implications of dual-task performance variables for design of generic workstations: Literature review
[AD-A114421] N83-10782
Two landings
[AD-A117466] N83-10783
Human performance tests for repeated measurements: Alternate forms of eight tests by computer
[AD-A115021] N83-10784
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786

HUMAN RESOURCES
Recommendations for color vision testing and criteria for its implementation at Sandia National Laboratories
[DE82-019826] N83-10772

HUMIDITY
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609

HUNGARY
Space research activities in Hungary, 1980 - 1981 N83-11014

HYBRID CIRCUITS
Hybrid microwave filters using interdigital and hairpin microstrip resonators
[INPE-2411-PRE/120] N83-10351
Design of 3 dB hybrid couplers using juxtaposed strip lines in homogeneous dielectrics
[INPE-2453-PRE/149] N83-10353

HYDRAULIC EQUIPMENT
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame
[AD-A117470] N83-10427
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] N83-10568
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] N83-10705

HYDROBALLISTICS
Lateral dynamics of C4 missile N83-10268

HYDROCARBON FUEL PRODUCTION
Water hyacinth wastewater treatment system N83-10586

HYDROCARBONS
Equation of state study for polar fluids
[PB82-214388] N83-10157

HYDROCHLORIC ACID
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment
[PB82-194895] N83-10187
Aluminum chloride hexahydrate crystallization by HC1 gas sparging
[PB82-177353] N83-10191

HYDROCRACKING
Role of tin catalysts in the hydroliquefaction of coal --- hydrocracking N83-10131

HYDRODYNAMICS
The hydrodynamics of rotating superfluids N83-10384
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394

HYDROELECTRIC POWER STATIONS
Seminar on Accelerated Hydroelectric Development in India: Proceedings, volume 1
[PB82-217753] N83-10634
Seminar on Accelerated Hydroelectric Development in India: Post session proceedings, volume 2
[PB82-217761] N83-10635

HYDROFOILS
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264

HYDROGEN
Studies of chemical adsorption using low energy electron diffraction N83-10130
Properties of Pt supported on oxides of titanium
[AD-A117892] N83-10139
Cell and module formation research area N83-10522
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560

HYDROGEN ATOMS
Experiments on continuum electron capture in atomic hydrogen and collisional interactions of trapped ions
[DE82-013939] N83-10891

HYDROGEN EMBRITTLEMENT
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166

HYDROGEN PRODUCTION
Solar-assisted hydrogen generation by photoelectrocatalysis
[PB82-227612] N83-10161

HYDROGEN RECOMBINATIONS
Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] N83-10502

HYDROGEN SULFIDE
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663

HYDROGENATION
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] N83-10625

HYDROGEOLOGY
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690

HYDROGRAPHY
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743
Weather constraints on airborne laser hydrography operations
[PB82-189754] N83-10745

HYDROLOGY
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon
[PB82-190356] N83-10491

HYDROLOGY MODELS
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720

HYDROMETALLURGY
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188

HYDROMETEOROLOGY
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723

HYGROMETERS
Elevated duct data-base improvement
[PB82-215906] N83-10343

HYPERBARIC CHAMBERS
Lung metabolism, function, and morphology during hyperoxic and hyperbaric exposure
[AD-A117074] N83-10763

HYPEROXIA
Lung metabolism, function, and morphology during hyperoxic and hyperbaric exposure
[AD-A117074] N83-10763

HYPOKINESIA
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749
Cardiovascular adaptations during long-term altered gravity
[NASA-CR-169438] N83-10750

HYPOTHESES
The theory of concentrated Fisher-von-Mises distributions
[AD-A117514] N83-10871
Large sample theory of the Fisher-von-Mises distribution
[AD-A117515] N83-10872

I

I BEAMS
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931

ICE
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149

ICE FORMATION
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness
[AD-A117745] N83-10041
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736

ICELAND
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688

IDEAL GAS
Notes on the unsteady rectilinear motion of a perfect gas. Part 5: A nonuniformly traveling shock wave in an LMS gas
[VTH-LR-328] N83-10398
Notes on the unsteady rectilinear motion of a perfect gas. Part 6: On a transformation of Staniukovich and its generalization
[VTH-LR-329] N83-10399

IDENTIFYING
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258

IGNITION
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations
[BBC-RD-1982/16] N83-10313

IGNITION TEMPERATURE
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128

ILLINOIS
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723

ILLUMINATING
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311

IMAGE ENHANCEMENT
Computer processed LANDSAT data N83-10463
Appendix B: Principles of computer processing of LANDSAT data N83-10470

IMAGE PROCESSING
End-to-end imaging information rate advantages of various alternative communication systems
[NASA-CR-169428] N83-10321
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458
Familiarization with LANDSAT imagery N83-10460
Some spectral and spatial characteristics of LANDSAT data N83-10461
Computer processed LANDSAT data N83-10463
TIROS-N series direct readout services users guide
[PB82-219023] N83-10728
General methods to enable robots with vision to acquire, orient and transport workpieces
[PB82-202540] N83-10788
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904
Studies of bistable optical devices
[AD-A117755] N83-10905

IMAGING TECHNIQUES
Imaging radiometry systems
[DE82-015862] N83-10364
Microstructure of coal N83-10576

IMPACT DAMAGE
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264

IMPACT LOADS
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300

IMPACT TESTING MACHINES
Random impact vibration testor N83-10234

IMPACT TESTS
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442

IMPEDANCE MEASUREMENT
State-of-the-art assessment of mobility measurements: A summary of European results N83-10218

IMPURITIES
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
Features of the structure of large forge ingots made from steel with different impurity content
[DRIC-T-6708] N83-10175
Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] N83-10631
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] N83-10949
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951

INCINERATORS
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
Conversion of municipal solid waste to energy, Jacksonville, Florida N83-10593

INCLUSIONS
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
The removal of non-metallic inclusions from steel
[BLL-M26519] N83-10164

INDEPENDENT VARIABLES
Fitting multidimensional splines using statistical variable selection techniques [NASA-CR-169363] N83-10867
INDEXES (DOCUMENTATION)
KWIC index for numerical algebra [DE82-008144] N83-10790
NASA Thesaurus. Volume 1: Hierarchical listing [NASA-SP-7051-VOL-1] N83-10980
NASA Thesaurus. Volume 2: Access vocabulary [NASA-SP-7051-VOL-2] N83-10981
INDIA
Copper Powder and Chemicals: Edited proceedings of a seminar [PB82-206202] N83-10192
Seminar on Accelerated Hydroelectric Development in India: Proceedings, volume 1 [PB82-217753] N83-10634
Seminar on Accelerated Hydroelectric Development in India: Post session proceedings, volume 2 [PB82-217761] N83-10635
Modification of Palmer drought index [PB82-181751] N83-10731
INDIUM PHOSPHIDES
Investigation of large diameter polycrystalline crucible shaped InP [AD-A117739] N83-10137
INDOOR AIR POLLUTION
Conserving energy by improving the quality of the air purifying and air conditioning systems [BMFT-FB-T-82-067] N83-10651
INDUCTANCE
Pulsed inductive thruster development (Advanced electric propulsion technology: High thrust). Volume 2. Supplement [AD-A117797] N83-10114
INDUCTION HEATING
Inductive heating of spent granular activated carbon [PB82-218603] N83-10123
INDUCTION MOTORS
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles [NASA-CR-167978] N83-10349
INDUSTRIAL ENERGY
Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings [BMFT-FB-T-82-095] N83-10397
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537
Urban waste as a potential source for brick plants N83-10591
INDUSTRIAL MANAGEMENT
Photovoltaic research needs industry perspective N83-10516
Allocating R and D resources: A study of the determinants of R and D by character of use [PB82-209800] N83-10975
INDUSTRIAL PLANTS
Compilation of air pollutant emission factors, supplement 12 [PB82-184722] N83-10654
INDUSTRIAL SAFETY
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations [BBC-RD-1982/16] N83-10313
Health effects of welding fumes and gases [DE82-012199] N83-10771
INDUSTRIES
Use of organofluorine compounds [NRC/CNR-TT-2027] N83-10115
Panel discussions: Industrial support sector requirements N83-10550
INELASTIC SCATTERING
The Doublet III Thomson-scattering-system hemiconcentric triplet lens [DE82-017384] N83-10908
INELASTIC STRESS
Rapid exact inelastic biaxial bending analysis [PB82-196650] N83-10455
INERTIA
The response spectrum method of solution for displacement excitation N83-10250
INERTIAL CONFINEMENT FUSION
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer [DE82-015493] N83-10409
Stability of propagating long ion ring layer [IPPJ-604] N83-10915
Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPPJ-602] N83-10917
Accelerator and fusion research division [DE82-012361] N83-10930
INERTIAL REFERENCE SYSTEMS
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information [AD-A116819] N83-10685
INFORMATION DISSEMINATION
Intercommunication between open networks [PB82-205188] N83-10843
INFORMATION RETRIEVAL
Medical subject headings, Tree annotations, 1983 [PB82-208653] N83-10773
NASA Thesaurus. Volume 1: Hierarchical listing [NASA-SP-7051-VOL-1] N83-10980
NASA Thesaurus. Volume 2: Access vocabulary [NASA-SP-7051-VOL-2] N83-10981
INFORMATION SYSTEMS
Geographic information systems N83-10465
Some closing thoughts: Practical payoffs from satellite systems N83-10468
The development of a geopressured energy management information system in support of research planning, phase 1 [PB82-207366] N83-10636
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory [PB82-184029] N83-10774
A logical database design framework [PB82-203316] N83-10986
Investigations of interlibrary resource-sharing networks [PB82-202417] N83-10987
INFORMATION THEORY
Utilization of the mathematical theory of communication in information sciences [REPT-1982-ST-133] N83-10340
KWIC index for numerical algebra [DE82-008144] N83-10790
INFRARED ASTRONOMY
Far infrared supplement: Catalog of infrared observations [NASA-TM-84001] N83-10999
Infrared/optical energy distributions of high redshifted quasars [NASA-CR-169436] N83-11001
INFRARED IMAGERY
Other remote sensing systems: Retrospect and outlook N83-10467
INFRARED SPECTRA
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds [DE82-015855] N83-10116
Infrared properties of serendipitous X-ray quasars [NASA-CR-169454] N83-10995
INGOTS
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot [BLL-M26518] N83-10163
Features of the structure of large forge ingots made from steel with different impurity content [DRIC-T-6708] N83-10175
Advanced Czohcralski ingot growth N83-10509
INJECTION
Field injection electrostatic spraying of liquid hydrogen N83-10215
INJURIES
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments [AD-A117464] N83-10765
INPUT
NECAP 4.1: NASA's Energy-Cost Analysis Program fast input manual and example [NASA-TM-83241] N83-10566
INSOLATION
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass. [DE82-015790] N83-10607
INSTRUMENT APPROACH
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results [NASA-TM-84258-PT-1] N83-10049
Predictor symbology in computer-generated pictorial displays [NASA-CR-169441] N83-10803
INSTRUMENT FLIGHT RULES
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations [NASA-CR-166274] N83-10029
INSTRUMENTS
Development of Egyptian instrumentation technology [PB82-199845] N83-10411
INSULATORS
The metal-ceramic X-ray tube [DRIC-T-6676] N83-10357
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface [PB82-174384] N83-10375
The fabrication and evalution of a silicon photovoltaic cell with a directly nitrided tunnel insulator N83-10564
Paramagnetic resonance studies of crystals N83-10935
INTAKE SYSTEMS
Flight effects of fan noise [NASA-CP-2242] N83-10883
Utilizing numerical techniques in turbofan inlet acoustic suppressor design [NASA-TM-82994] N83-10885
INTEGRAL EQUATIONS
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445
A combined optical/microwave approach to crop classification N83-10457
Correlation and moment properties relating numerical integration and stochastic integrals [DE82-016088] N83-10855
INTEGRATED CIRCUITS
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths [PB82-217183] N83-10284
Total-dose radiation effects data for semiconductor devices, volume 3 [NASA-CR-169430] N83-10350
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits [PB82-214067] N83-10374
Matrix model of digital systems and its use in automatic test generation [DE82-017640] N83-10616
INTERFACES
An investigation of interfacial reactions in metal matrix composites [AD-A117741] N83-10176
The electrical properties of the anodic oxide/GaAs interface N83-10356
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface [PB82-174384] N83-10375
ORION: An interactive post-processor for the analysis codes NIKE2D, DYNA2D, and TACO2D [DE82-010710] N83-10822
INTERFEROMETERS
Faraday-rotation measurements in ISX-B [DE82-011507] N83-10953
INTERFEROMETRY
Holographic interferometry technique for rotary wing aerodynamics and noise [NASA-TM-84723] N83-10378
INTERNAL ENERGY
Improvements in CSQII: An improved numerical convection algorithm [DE82-014264] N83-10820
INTERNATIONAL COOPERATION
Intercomparison of primary and secondary standard seawater samples [PB82-215716] N83-10741
INTERPLANETARY MAGNETIC FIELDS
Stationarity of magnetohydrodynamic fluctuations in the solar wind [NASA-TM-83963] N83-11007
INTERSTELLAR MATTER
The peculiar extinction of Herschel 36 [NASA-TM-84893] N83-10998
INTESTINES
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling [RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling [RR-187] N83-10754
INVARIANCE
Temperature limit in ECH hot electron plasmas [DE82-015820] N83-10956
INVERSE SCATTERING
Ray methods for inverse problems of elastic wave scattering N83-10315
INVESTMENT
An economic evaluation of solar energy N83-10549
INVESTMENTS
Commercialization of parabolic dish systems N83-10540
IO
Io: Escape and ionization of atmospheric gases [NASA-CR-169443] N83-11004

Other satellite atmospheres: Their nature and planetary interactions
[NASA-CR-169439] N83-11005

IODINE LASERS
Discharge pumped iodine monofluoride laser: Operating parameters and collisional kinetics N83-10901

ION BEAMS
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409
High-powered pulsed-ion-beam acceleration and transport
[DE82-006879] N83-10894
Stability of propagating long ion ring layer
[IPPJ-604] N83-10915
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] N83-10917

ION CYCLOTRON RADIATION
Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] N83-10933

ION DENSITY (CONCENTRATION)
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409

ION EXCHANGING
Orifice plate design studies for a multiple-compartment, ion-exchange column
[PB82-201310] N83-10155

ION IMPLANTATION
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits
[PB82-214067] N83-10374
Laser annealing of ion implanted silicon N83-10418
Cell and module formation research area N83-10522

ION MOTION
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169

ION PLATING
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194

ION SHEATHS
Stability of propagating long ion ring layer
[IPPJ-604] N83-10915

IONIZATION
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020
External ionization mechanisms for advanced thermionic converters N83-10496

IONIZING RADIATION
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350

IONOGRAMS
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678

IONOSPHERE
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678
Space research activities in Hungary, 1980 - 1981 N83-11014

IONS
Production and experimental study of the dissipative trapped ion instability N83-10910
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916

IRON
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180
A fracture mechanism map for pure iron
[PB82-189150] N83-10454

IRON COMPOUNDS
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574

IRON ORES
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178

IRREGULARITIES
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678

ISOLATION
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140
Behavioral and biological interactions with small groups in confined microsocieties
[NASA-CR-169445] N83-10777

ISOPARAMETRIC FINITE ELEMENTS
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007

ISOTOPES
FORIG: A modification of the ORIGEN2 isotope-generation and depletion code for fusion problems
[DE82-016133] N83-10819

ISOTROPIC MEDIA
Equation of state study for polar fluids
[PB82-214388] N83-10157

ITERATION
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010

ITERATIVE SOLUTION
An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide)
[DE82-017351] N83-10825
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827

J

J INTEGRAL
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007

JACOBI MATRIX METHOD
Conditioning of matrices arising in the solution of stiff ODEs
[DE82-017641] N83-10878

JAMMING
Direct sequence spread spectrum communications: Applications to multiple access and jamming resistance N83-10328

JET AIRCRAFT
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024

JET AIRCRAFT NOISE
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247

JET ENGINE FUELS
Refining of military jet fuels from shale oil. Part 1. Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] N83-10210
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211

JET FLOW
Jet response to pure tone excitation
[UTIAS-TN-232] N83-10381
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888

JOINING
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] N83-10555

JUDGMENTS
Two landings
[AD-A117466] N83-10783

JUPITER ATMOSPHERE
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003

K

KALMAN FILTERS
Adaptive estimation of state noise in a Kalman filter
[INPE-2440-PRE/141] N83-10352

KAOLINITE
Aluminum chloride hexahydrate crystallization by HCl gas sparging
[PB82-177353] N83-10191

KERNEL FUNCTIONS
On the maximal function for the Mehler kernel
[CTH-MATH-1982-8] N83-10860

KERR ELECTROOPTICAL EFFECT
Magnetooptical light switches in electrophotographic printers
[BMFT-FB-T-82-092] N83-10410

KERR MAGNETOOPTICAL EFFECT
Proposal to develop techniques using magneto-optic and electro-optic effects in optical fiber for CTR diagnostics
[DE82-009548] N83-10907

KINETIC ENERGY
Improvements in CSQII: An improved numerical convection algorithm
[DE82-014264] N83-10820

KINETIC EQUATIONS
Singular perturbation aspects of kinetic equations N83-10913

KINETIC THEORY
Kinetic theory of tearing modes N83-10911
Singular perturbation aspects of kinetic equations N83-10913

KLEIN-GORDON EQUATION
On scattering and everywhere defined scattering operators for nonlinear Klein-Gordon equations
[CTH-MATH-1982-09] N83-10859

KLYSTRONS
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322

L

LABORATORIES
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090

LABORATORY EQUIPMENT
Electrophoresis device
[NASA-CASE-MFS-25426-1] N83-10126

LAKES
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489

LAMINAR FLOW
Flutter clearance of the horizontal tail of the Bellanca Skyrocket II airplane
[NASA-TM-84528] N83-10035
New higher-order boundary-layer equations for laminar and turbulent flow past axisymmetric bodies
[AD-A117806] N83-10392

LAMINATES
On the vibration of fiber reinforced laminated plates N83-10009
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119
Advanced residual strength degradation rate modeling for advanced composite structures
[AD-A115185] N83-10121
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage
[NASA-CR-169461] N83-10448
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates
[NASA-CR-169462] N83-10449

LAND MANAGEMENT
The ecology of Southern California coastal salt marshes: A community profile
[PB82-205717] N83-10655
State and local acquisition of floodplains and wetlands: A handbook on the use of acquisition in floodplain management
[PB82-284805] N83-10664

LAND USE
The ecology of New England high salt marshes: A community profile
[PB82-217118] N83-10658
LANDFILLS
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596
LANDING
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
LANDSAT SATELLITES
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458
Appendix A: The LANDSAT system N83-10469
LARGE SCALE INTEGRATION
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
Manufacturing techniques of large scale hybrid microelectronics
[AD-A117542] N83-10361
Investigation of the behavior of noise-sensitive electronic circuits for automotive applications with particular attention to MOS circuits
[PB82-211392] N83-10372
LARGE SPACE STRUCTURES
Active Control of Space Structures (ACOSS) Eleven
[AD-A117596] N83-10111
Low-authority control synthesis for large space structures
[NASA-CR-3495] N83-10441
LARMOR RADIUS
Kinetic theory of tearing modes N83-10911
LASER ANNEALING
Laser annealing of ion implanted silicon N83-10418
LASER APPLICATIONS
Weather constraints on airborne laser hydrography operations
[PB82-189754] N83-10745
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766
LASER DAMAGE
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766
LASER FUSION
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947
LASER OUTPUTS
Discharge pumped iodine monofluoride laser: Operating parameters and collisional kinetics N83-10901
LASER PLASMAS
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916
LASER PUMPING
A blackbody radiation-pumped CO2 laser experiment
[NASA-TM-84541] N83-10420
Discharge pumped iodine monofluoride laser: Operating parameters and collisional kinetics N83-10901
LASER SPECTROMETERS
Criteria for an optimum laser detector system for Thomson scattering experiments on fusion plasmas
[IPF-82-4] N83-10422
LASER SPECTROSCOPY
Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer
[NASA-TM-83964] N83-10903
LASERS
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
Dynamic characteristics of aluminum gallium arsenide-gallium arsenide conventional and quantum well double heterostructure laser diodes N83-10419
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215138] N83-10707
LATERAL STABILITY
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262
Lateral dynamics of C4 missile N83-10268
LATHES
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
LATTICE PARAMETERS
Tricritical points and ising models on a hierarchical lattice N83-10961
LATTICES (MATHEMATICS)
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
LAUNCHING
Atmospheric environment for Space Shuttle (STS-4) launch
[NASA-TM-82498] N83-10108
LEACHING
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188
Improvements in heap leaching to recover silver and gold from low-grade resources
[PB82-193434] N83-10189
Aluminum chloride hexahydrate crystallization by HCl gas sparging
[PB82-177353] N83-10191
LEAD (METAL)
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889
LEAD ACID BATTERIES
Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] N83-10619
LEAD ALLOYS
Demonstration Tokamak power plant study
[DE82-016182] N83-10937
LEADING EDGES
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018
LEAKAGE
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030
[NASA-TM-82497] N83-10094
LEBESGUE THEOREM
On the maximal function for the Mehler kernel
[CTH-MATH-1982-8] N83-10860
LEVEL (HORIZONTAL)
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489
LEVELING
Results of leveling refraction tests by the National Geodetic Survey
[PB82-193921] N83-10484
LIBRARIES
Investigations of interlibrary resource-sharing networks
[PB82-202417] N83-10987
LIFE (DURABILITY)
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
LIFE CYCLE COSTS
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
LIFT
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
LIGHT AIRCRAFT
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034
LIGHT SCATTERING
Quasielastic light scattering from dilute and semidilute polymer solutions
[DE82-016806] N83-10197
LIGHTNING
Laboratory modeling and analysis of aircraft-lightning interactions
[NASA-CR-169455] N83-10023
LIMESTONE
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
LINEAR ACCELERATORS
Accelerator and fusion research division
[DE82-012361] N83-10930
LINEAR EQUATIONS
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
Numerical solution of linear parabolic partial differential equation with infinite range for space variable
[PB82-188905] N83-10864
LINEAR PROGRAMMING
Sparse linear programming subprogram
[DE82-011783] N83-10826
Powerful tool for design analysis of linear control systems
[DE82-015141] N83-10851
LINEAR SYSTEMS
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845
Identification of multivariate linear systems
[DE82-015201] N83-10873
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876
LIQUEFACTION
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
LIQUID CHROMATOGRAPHY
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209
LIQUID HELIUM
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980] N83-10081
The hydrodynamics of rotating superfluids N83-10384
LIQUID HYDROGEN
Field injection electrostatic spraying of liquid hydrogen N83-10215
LIQUID NITROGEN
Sensitivity analysis of cool-down strategies for a transonic cryogenic tunnel
[NASA-TM-84527] N83-10082
LIQUID PHASES
Equation of state study for polar fluids
[PB82-214388] N83-10157
LIQUID PROPELLANT ROCKET ENGINES
Statistical estimation of liquid propellent rocket engine parameters N83-10011
LIQUID-VAPOR EQUILIBRIUM
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160
LIQUIDS
Sound propagation through liquids in viscoelastic circular cylinders N83-10230
LITHIUM SULFUR BATTERIES
Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] N83-10504
LITHOSPHERE
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680
LOADING OPERATIONS
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617
LOADS (FORCES)
Necessary and sufficient qualification for shock N83-10220
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
LOCI
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
LOGIC CIRCUITS
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
LOGIC DESIGN
Development of an eight-bit microprocessor component family in CMOS technology --- R and D in miniaturization of microprocessor components
[BMFT-FB-T-82-089] N83-10796

LONGITUDINAL CONTROL
Gain and phase margin as a basis of longitudinal flying qualities evaluation --- fighter aircraft N83-10059
Handling qualities criteria for longitudinal control N83-10062
Bandwidth: A criterion for highly augmented airplanes N83-10063
The status of military helicopter handling qualities criteria N83-10065

LONGITUDINAL STABILITY
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
Fly by wire control: Towards new norms for judging flight qualities. An example: The Mirage 2000 N83-10060
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076

LOOP ANTENNAS
Self consistent loop antenna theory
[IPP-4/205] N83-10319

LOOPS
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064

LOW ALTITUDE
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10096

LOW NOISE
Low noise computationally efficient methods in digital signal processing N83-10318

LOWER ATMOSPHERE
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2
[NASA-CR-3557] N83-10646

LUBRICANT TESTS
An introduction to chemiluminescence methods for lubricant oxidation studies
[PB82-207515] N83-10199

LUBRICATING OILS
An introduction to chemiluminescence methods for lubricant oxidation studies
[PB82-207515] N83-10199

LUMINAIRES
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311

LUMINESCENCE
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
The luminescent solar concentrator N83-10902

LUNAR MAPS
Rotating gravity gradiometer study
[NASA-CR-169440] N83-10404

LUNAR ORBITER
Rotating gravity gradiometer study
[NASA-CR-169440] N83-10404

LUNG MORPHOLOGY
Lung metabolism, function, and morphology during hyperoxic and hyperbaric exposure
[AD-A117074] N83-10763

LUNGS
Lung metabolism, function, and morphology during hyperoxic and hyperbaric exposure
[AD-A117074] N83-10763

LYMAN ALPHA RADIATION
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916

LYMAN SPECTRA
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916

M

MACHINE TOOLS
Forming techniques and procedures
[PB82-269002] N83-10298

MACHINERY
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428

MAGNESIUM
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10683

MAGNET COILS
EDESS: An electromagnetically-driven explosive-shock simulator --- generating explosive-like shocks in shipboard equipment N83-10245
Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] N83-10945

MAGNETIC ANOMALIES
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677

MAGNETIC COMPRESSION
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] N83-10928

MAGNETIC DIFFUSION
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] N83-10919

MAGNETIC FIELD CONFIGURATIONS
Vacuum magnetic fields with dense flux surfaces
[DE82-014989] N83-10881

MAGNETIC FIELDS
Dye-laser development for plasma magnetic-field diagnostic
[DE82-016421] N83-10421
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] N83-10919
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924
Experimental investiation of neutral plasma beam propagation across a magnetic field
[AD-A117765] N83-10927
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] N83-10940

MAGNETIC FLUX
Vacuum magnetic fields with dense flux surfaces
[DE82-014989] N83-10881
Measurements of magnetic field fluctuations in the Caltech research Tokamak N83-10925

MAGNETIC MEASUREMENT
Measurements of magnetic field fluctuations in the Caltech research Tokamak N83-10925

MAGNETIC MIRRORS
Technology spin-offs from the magnetic fusion energy program
[DE82-016923] N83-10897
Production and experimental study of the dissipative trapped ion instability N83-10910
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] N83-10920
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922
Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] N83-10941
Radial transport, end loss, and ambipolarity in tandem mirrors
[DE82-019546] N83-10955

MAGNETIC STORMS
Solar-Geophysical Data Number 450, supplement. Explanation of data reports
[PB82-200940] N83-11009

MAGNETIC SURVEYS
Magnetometric resistivity survey near Fortymile Wash, Nevada Test Site, Nevada
[DE82-016956] N83-10701

MAGNETIC SUSPENSION
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980] N83-10081

MAGNETIC VARIATIONS
Measurements of magnetic field fluctuations in the Caltech research Tokamak N83-10925

MAGNETOHYDRODYNAMIC STABILITY
Stability of propagating long ion ring layer
[IPPJ-604] N83-10915
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] N83-10917
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939
Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] N83-10941
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942
Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] N83-10945

MAGNETOHYDRODYNAMIC WAVES
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma
[DE82-019902] N83-10929
Wildcat: A catalyzed D-D Tokamak reactor
[DE82-013712] N83-10938

MAGNETOHYDRODYNAMICS
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] N83-10935
Stationarity of magnetohydrodynamic fluctuations in the solar wind
[NASA-TM-83963] N83-11007

MAGNETOMETERS
Rotating gravity gradiometer study
[NASA-CR-169440] N83-10404

MAGNETORESISTIVITY
Magnetometric resistivity survey near Fortymile Wash, Nevada Test Site, Nevada
[DE82-016956] N83-10701

MAGNETOSPHERE
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677

MAINTAINABILITY
Department of Defense policy on reliability and maintainability N83-10219
Low maintenance building with inorganic materials
[PB82-206343] N83-10307

MAINTENANCE
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288
Project analysis and integration area N83-10524

MALES
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

MAN MACHINE SYSTEMS
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079
Simulation for predicting flying qualities N83-10080
Implications of dual-task performance variables for design of generic workstations: Literature review
[AD-A114421] N83-10782
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-VOL-4] N83-10849

MANAGEMENT ANALYSIS
Appraisal of the Comax conception
[PB82-204413] N83-10976

MANAGEMENT INFORMATION SYSTEMS
Word processing/office information systems: Managers perspective, a management tool
[DE82-016000] N83-10984

MANAGEMENT METHODS
Experiences in transportation system management
[PB82-181322] N83-10303
Casual User Project: Problems, proposed solutions, and implementation
[DE82-016407] N83-10842
Appraisal of the Comax conception
[PB82-204413] N83-10976

MANEUVERABILITY
Aerodynamic characteristics of maneuvering flaps N83-10004
The status of military helicopter handling qualities criteria N83-10065
The impact of active control on helicopter handling qualities N83-10066
Operational criteria for the handling qualities of combat helicopters N83-10067
Stability and control for high angle of attack maneuvering N83-10069

MANIPULATORS
General methods to enable robots with vision to acquire, orient and transport workpieces
[PB82-202540] N83-10788

MANNED SPACE FLIGHT
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-V0L-4] N83-10849

MANPOWER
Project analysis and integration area N83-10524

MANUAL CONTROL
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785

MANUALS
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10857
PLOTT: A graphics application package for production of publication-quality graphs
[DE82-015031] N83-10985

MANUFACTURING
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
Manufacturing techniques of large scale hybrid microelectronics
[AD-A117542] N83-10361
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits
[PB82-214067] N83-10374
Exploiting spatial and structural locality in geometric modelling
[PB82-212937] N83-10863

MAPPING
Ray methods for inverse problems of elastic wave scattering N83-10315
Standardization of map symbology
[AD-A117530] N83-10475
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698

MAPS
A fracture mechanism map for pure iron
[PB82-189150] N83-10454
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946

MARINE BIOLOGY
The eastern Bering Sea shelf: Oceanography and resources, volume 2
[PB82-181306] N83-10746
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

MARINE ENVIRONMENTS
Remote sensing, a tool for managing the marine environment: Eight case studies
[PB82-220864] N83-10483
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring, Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
Ocean pollution research, development and monitoring
[PB82-219049] N83-10740
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755

MARINE METEOROLOGY
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473

MARINE PROPULSION
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10806

MARINE RESOURCES
The eastern Bering Sea shelf: Oceanography and resources, volume 2
[PB82-181306] N83-10746

MARKET RESEARCH
PV large systems project N83-10512

MARKETING
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296

MARKING
Low cost pavement marking materials based on plasticized sulfur
[PB82-217969] N83-10289

MARKOV PROCESSES
Markov reliability models for repairable distributed systems N83-10839
Germ-Markov processes N83-10865
Superposition of Markov renewal processes N83-10866

MARSHLANDS
The ecology of Southern California coastal salt marshes: A community profile
[PB82-205717] N83-10655
The ecology of New England high salt marshes: A community profile
[PB82-217118] N83-10658

MASKING
Introduction of an electron beam maskprinter system for LSI maskmaking
[BMFT-FB-T-82-110] N83-10371

MASONRY
Investigation into methods of nondestructive evaluation of masonry structures
[PB82-218074] N83-10280
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane
[PB82-213687] N83-10281

MASS RATIOS
Study of Guyan reduction of two degree of freedom systems N83-10255

MASS SPECTROSCOPY
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200

MASS TRANSFER
Improvements in CSQII: An improved numerical convection algorithm
[DE82-014264] N83-10820

MATERIALS RECOVERY
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188
Process development for economical processng of various vanadium bearing materials
[BMFT-FB-T-82-097] N83-10630

MATHEMATICAL MODELS
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051
Augmentor stability management program user's manual
[AD-A117749] N83-10138
On modeling viscoelastic behavior N83-10222
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
Dynamic response of the progressively damaging structures N83-10267
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82876] N83-10389
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
Reliability and safety of power systems --- mathematical models
[BMFT-FB-T-82-080] N83-10432
Rapid exact inelastic biaxial bending analysis
[PB82-196650] N83-10455
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785
Matrix model of digital systems and its use in automatic test generation
[DE82-017640] N83-10816
Approximate solutions to queueing networks with state dependent parameters N83-10847
Exploiting spatial and structural locality in geometric modelling
[PB82-212937] N83-10863
Radial transport, end loss, and ambipolarity in tandem mirrors
[DE82-019546] N83-10955
Modeling of thin film GaAs growth
[NASA-CR-169366] N83-10963
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974
Appraisal of the Comax conception
[PB82-204413] N83-10976

MATHEMATICAL PROGRAMMING
Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] N83-10498
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974

MATHEMATICS
KWIC index for numerical algebra
[DE82-008144] N83-10790

MATRICES (MATHEMATICS)
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide)
[DE82-017351] N83-10825
Contributions to reduced order control theory N83-10846

MATRIX MATERIALS
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage
[NASA-CR-169461] N83-10448
Solar energy conversion based on the principe of fluorescent collectors
[BMFT-FB-T-82-081] N83-10621

MAXIMUM PRINCIPLE
On the maximal function for the Mehler kernel
[CTH-MATH-1982-8] N83-10860

MECHANICAL DEVICES
Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] N83-10429

MECHANICAL IMPEDANCE
State-of-the-art assessment of mobility measurements: A summary of European results N83-10218

MECHANICAL PROPERTIES
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing
[PB82-213679] N83-10274
Investigation into methods of nondestructive evaluation of masonry structures
[PB82-218074] N83-10280
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane
[PB82-213687] N83-10281
Magnetoelastic instabilities and vibrations of superconducting-magnet systems
[DE82-015206] N83-10880

MECHANICAL SHOCK
Necessary and sufficient qualification for shock N83-10220
Myths and sacred cows in shock and vibration N83-10221

MEDICAL EQUIPMENT
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test
[AD-A115052] N83-10769

MEDICAL SCIENCE
Medical subject headings, Tree annotations, 1983
[PB82-208653] N83-10773
Medical Physics Data Book
[PB82-217175] N83-10775

MEDICAL SERVICES
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768

MELTING
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149
Laser annealing of ion implanted silicon N83-10418

MELTING POINTS
Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] N83-10207

MEMBRANES
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona
[PB82-177965] N83-10158
Membrane controlled anaerobic digestion N83-10497
MEMORY
The use of dual task paradigms in memory research: A methodological assessment and an evaluation of effort as a measure of levels of processing
[AD-A115093] N83-10779
MENISCI
Tricritical points and ising models on a hierarchical lattice N83-10961
MENTAL PERFORMANCE
Implications of dual-task performance variables for design of generic workstations: Literature review
[AD-A114421] N83-10782
MESOSCALE PHENOMENA
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
MESSAGE PROCESSING
A suggested message structure standard for GILT
[FOA-C-10199-M6] N83-10835
METAL BONDING
Further industrial tests of ceramic thermal barrier coatings
[NASA-TP-2057] N83-10045
METAL FATIGUE
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169
METAL HALIDES
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417
METAL IONS
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10683
METAL JOINTS
Mechanical bonding of metal method
[NASA-CASE-LEW-12941-1] N83-10170
METAL MATRIX COMPOSITES
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176
METAL OXIDE SEMICONDUCTORS
The electrical properties of the anodic oxide/GaAs interface N83-10356
Investigation of the behavior of noise-sensitive electronic circuits for automotive applications with particular attention to MOS circuits
[PB82-211392] N83-10372
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits
[PB82-214067] N83-10374
CS1: A two-dimensional finite element charge-sheet model of a short-channel MOS transistor
[PB82-205709] N83-10376
METAL OXIDES
Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] N83-10494
METAL VAPOR LASERS
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417
METAL-METAL BONDING
Mechanical bonding of metal method
[NASA-CASE-LEW-12941-1] N83-10170
METALLIZING
Cell and module formation research area N83-10522
Project analysis and integration area N83-10524
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554
METALLOGRAPHY
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185
METALS
Representation of cracks by dislocations and its application to the fracture toughness of metals
[GKSS-82/E/11] N83-10451
METASTABLE STATE
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
METEOROLOGICAL CHARTS
Central San Joaquin Valley type maps
[PB82-196064] N83-10733
METEOROLOGICAL PARAMETERS
Atmospheric environment for Space Shuttle (STS-4) launch
[NASA-TM-82498] N83-10108
Development of meteorological scenarios for air quality planning using multivariate statistical analysis of meteorological and air quality data N83-10644
USSR report: Earth sciences, no. 23
[JPRS-81965] N83-10713
Surface meteorological features associated with eastern Colorado severe convective storms
[PB82-203134] N83-10722
Meteorology and air quality patterns in St. Louis RAPS Program, upper level analyses
[PB82-217522] N83-10729
METEOROLOGICAL SERVICES
The federal plan for meteorological services and supporting research, fiscal year 1983
[PB82-215708] N83-10725
METEOROLOGY
Space research activities in Hungary, 1980 - 1981 N83-11014
METHANATION
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756
METHANE
Flames in straining flows --- flame propagation N83-10136
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227079] N83-10160
Studies related to the deep earth gas
[PB82-227653] N83-10213
Membrane controlled anaerobic digestion N83-10497
Solid waste to methane gas (RefCOM) N83-10584
Water hyacinth wastewater treatment system N83-10586
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596
METHOD OF CHARACTERISTICS
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
METHYL ALCOHOLS
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory
[PB82-215054] N83-10639
METROLOGY
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
MICROBALLOONS
Investigation of concrete mixtures incorporating hollow plastic microspheres
[PB82-198193] N83-10125
MICROBIOLOGY
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756
MICROCOMPUTERS
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027
Upsets in microprocessor controllers N83-10791
Overview of the LINCS architecture
[DE82-010600] N83-10794
MICROCRACKS
Dynamic response of the progressively damaging structures N83-10267
MICROMINIATURIZATION
Manufacturing techniques of large scale hybrid microelectronics
[AD-A117542] N83-10361
MICROPHONES
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886
MICROPROCESSORS
Feedback information and analysis for microprocessor controlled muscle stimulation
[AD-A115532] N83-10767
Upsets in microprocessor controllers N83-10791
Development of an eight-bit microprocessor component family in CMOS technology --- R and D in miniaturization of microprocessor components
[BMFT-FB-T-82-089] N83-10796
Development of a single chip microprocessor in CMOS silicon gate technology. Further development of four bit microprocessor concept in CMOS technology
[BMFT-FB-T-82-088] N83-10797
MICROSCOPY
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
MICROSTRIP TRANSMISSION LINES
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
MICROSTRUCTURE
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185
Microstructure of coal N83-10576
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
MICROWAVE EQUIPMENT
RF characterization of semiconductors
[DE82-016995] N83-10335
MICROWAVE FILTERS
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz
[INPE-2463-PRE/155] N83-10326
Hybrid microwave filters using interdigital and hairpin microstrip resonators
[INPE-2411-PRE/120] N83-10351
MICROWAVE OSCILLATORS
Microwave oscillator stabilized by a dielectric resonator at 5.4 GHz
[INPE-2436-PRE/137] N83-10355
MICROWAVE RADIOMETERS
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040
MICROWAVE SENSORS
A combined optical/microwave approach to crop classification N83-10457
MICROWAVE TRANSMISSION
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
MICROWAVE TUBES
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
MICROWAVES
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
MILITARY HELICOPTERS
Criteria for Handling Qualities of Military Aircraft
[AGARD-CP-333] N83-10054
The status of military helicopter handling qualities criteria N83-10065
The impact of active control on helicopter handling qualities N83-10066
Operational criteria for the handling qualities of combat helicopters N83-10067
MILITARY PSYCHOLOGY
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780
MINERAL DEPOSITS
Critical and strategic minerals in Alaska: Cobalt, the platinum-group metals and chromite
[PB82-193085] N83-10485
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
MINES (EXCAVATIONS)
Improved roadheading by dinting behind the face line to full section
[BMFT-FB-T-82-087] N83-10478
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
MINIATURIZATION
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
MINING
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492

Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] N83-10503
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617

MIRAGE AIRCRAFT
Fly by wire control: Towards new norms for judging flight qualities. An example: The Mirage 2000 N83-10060

MIRROR FUSION
Stability and disturbance of large dc superconducting magnets
[DE82-012388] N83-10879
Technology spin-offs from the magnetic fusion energy program
[DE82-016923] N83-10897

MIRRORS
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610
Standard reference materials: Preparation and calibration of first surface aluminum mirror specular reflectance standards
[PB82-221367] N83-10909
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947

MIS (SEMICONDUCTORS)
Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] N83-10620
Investigation of new solar cells. Part A: Novel semiconductors and their suitability. Part B: Polycrystalline MIS diodes
[BMFT-FB-T-82-103] N83-10632

MISSILE LAUNCHERS
Antitank missiles night firing from Aerospatiale helicopters
[SNIAS-822-320-101] N83-10102
Lateral dynamics of C4 missile N83-10268

MIXING
Computer modeling of mixing and aggloreration in coal-conversion reactors. Volume 1: Model formulation
[DE82-014836] N83-10212

MODAL RESPONSE
Spacecraft modal testing using systematic multi-shakers sine-dwell testing techniques N83-10236
The response spectrum method of solution for displacement excitation N83-10250
An improved recursive formula for calculating shock response spectra N83-10251
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258

MODCOMP II COMPUTER
Software tools and more for Modcomp computers
[DE82-007985] N83-10823

MODULATION
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314

MODULATORS
A modified adaptive delta modulator for video data compression N83-10317
Modulation techniques
[NASA-CR-169460] N83-10329

MODULES
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
Entity types and relationships (for a data dictionary system)
[PB82-203688] N83-10836

MOISTURE
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682

MOISTURE CONTENT
The heat capacity of coal chars N83-10206
Behavior of buoyant moist plumes in turbulent atmospheres
[PB82-180241] N83-10668

MOLECULAR BEAMS
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892

MOLECULAR CHAINS
The connectivity of polymer networks by neutron scattering and a statistical theory of hard rod neumatic fluids
[PB82-208554] N83-10202

MOLECULAR DIFFUSION
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169

MOLECULAR STRUCTURE
Quasielastic light scattering from dilute and semidilute polymer solutions
[DE82-016806] N83-10197

MOLLUSKS
Environmental Research Guiding Committee report
[PB82-220070] N83-10661

MOLTEN SALTS
Electrochemical studies of platinum-group metals in molten alkali metal cyanides
[PB82-202243] N83-10190

MOMENTS
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807

MOMENTUM TRANSFER
Improvements in CSQII: An improved numerical convection algorithm
[DE82-014264] N83-10820

MONOCHROMATIC RADIATION
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900

MONTE CARLO METHOD
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957

MOORING
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244

MORTARS (MATERIAL)
Sulfate resistance of mortars using fly ash as a partial replacement for Portland cement
[PB82-208810] N83-10305

MOTIVATION
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

MOUNTAINS
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694

MOUNTING
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038

MOVING TARGET INDICATORS
Direct aircraft velocity determination by L-band moving target detector radar
[AD-A117512] N83-10031

MULTIPLE ACCESS
Direct sequence spread spectrum communications: Applications to multiple access and jamming resistance N83-10328
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904

MULTIPROCESSING (COMPUTERS)
Programming languages for bit-serial array machines N83-10802

MULTISPECTRAL PHOTOGRAPHY
Some spectral and spatial characteristics of LANDSAT data N83-10461

MULTIVARIATE STATISTICAL ANALYSIS
A principal components approach to some multivariate estimation problems with incomplete data N83-10868
Identification of multivariate linear systems
[DE82-015201] N83-10873

MUSCLES
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762
Feedback information and analysis for microprocessor controlled muscle stimulation
[AD-A115532] N83-10767

MUSCULOSKELETAL SYSTEM
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749

MX MISSILE
Configuration selection study for isolated loads using parabolic dish modules N83-10548

N

N-TYPE SEMICONDUCTORS
Solar-assisted hydrogen generation by photoelectrocatalysis
[PB82-227612] N83-10161

NACELLES
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
Utilizing numerical techniques in turbofan inlet acoustic suppressor design
[NASA-TM-82994] N83-10885

NASA PROGRAMS
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 1: Abstracts
[NASA-SP-7039(21)-SECT-1] N83-10978
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 2: Abstracts
[NASA-SP-7039(21)-SECT-2] N83-10979
National Aeronautics and Space Administration N83-10989

NATURAL GAS
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160
Studies related to the deep earth gas
[PB82-227653] N83-10213
Application of the subatmospheric engine to solar thermal power N83-10546
The development of a geopressured energy management information system in support of research planning, phase 1
[PB82-207366] N83-10638

NAVIER-STOKES EQUATION
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689

NAVIGATION AIDS
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations
[NASA-CR-166274] N83-10029
Flight testing operations procedure
[AD-A116984] N83-10030

NEAR FIELDS
Ultralow sidelobe planar near field measurement study
[AD-A117744] N83-10331

NEAR INFRARED RADIATION
Near infrared refractive index of bismuth germanium oxide ($Bi_{12}GeO_{20}$)
[ISS-RAD-82/2] N83-10969

NETWORK CONTROL
Approximate solutions to queueing networks with state dependent parameters N83-10847

NEUTRAL ATOMS
Charge-capture experiments for plasma ions and neutral atoms
[DE82-014502] N83-10954

NEUTRON FLUX DENSITY
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947

NEUTRONS
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889

NEVADA
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690

NEW JERSEY
A case study in the practical use of LANDSAT data N83-10466

NEW MEXICO
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698

NEWTON THEORY
Consistent guiding center drift theories
[IPP-6/212] N83-10914
NEWTON-RAPHSON METHOD
Effective dynamic reanalysis of large structures
N83-10259
NICKEL
Standard reference materials: A standard reference material containing nominally fifteen percent austenite (SRM 486)
[PB82-215559] N83-10147
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171
NICKEL CADMIUM BATTERIES
Deep discharge reconditioning and shorted storage of batteries --- nickel cadmium batteries
[NASA-CR-167953] N83-10502
NICKEL COATINGS
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
NICKEL COMPOUNDS
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] N83-10159
NICKEL HYDROGEN BATTERIES
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134
NICKEL OXIDES
Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] N83-10135
NICKEL STEELS
Features of the structure of large forge ingots made from steel with different impurity content
[DRIC-T-6708] N83-10175
NIGHT SKY
Anomalous twilights related to the Tungussk Meteorite
[NASA-TM-76707] N83-11006
NIGHT VISION
Antitank missiles night firing from Aerospatiale helicopters
[SNIAS-822-320-101] N83-10102
NITRATION
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209
NITRIC ACID
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
NITRIDING
The fabrication and evalution of a silicon photovoltaic cell with a directly nitrided tunnel insulator N83-10564
NITROGEN
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755
NITROGEN METABOLISM
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 2: Detailed program descriptions, listings, examples and hardware specifications
[NASA-CR-167737] N83-10760
NITROGEN OXIDES
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] N83-10557
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] N83-10559
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665
NITROUS OXIDES
Control of NO sub x by combustion process modifications
[PB82-180175] N83-10669
NODES (STANDING WAVES)
A rapidly recursive method for the B-splines
N83-10015
NOISE PREDICTION (AIRCRAFT)
The Shock and Vibration Digest, volume 14, no. 8
[AD-A119004] N83-10433
NOISE PROPAGATION
The Shock and Vibration Digest, volume 14, no. 8
[AD-A119004] N83-10433
A review of structural noise transmission N83-10434
Recent research on noise transmission into aircraft
N83-10435
NOISE REDUCTION
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309
Holographic interferometry technique for rotary wing aerodynamics and noise
[NASA-TM-84723] N83-10378
Flight effects of fan noise
[NASA-CP-2242] N83-10883
NONDESTRUCTIVE TESTS
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
Investigation into methods of nondestructive evaluation of masonry structures
[PB82-218074] N83-10280
High-frequency ultrasonics: Non-destructive analysis of material structures
[BLL-RISLEY-TR-4166F-(9091.9F)] N83-10431
NONFLAMMABLE MATERIALS
Low maintenance building with inorganic materials
[PB82-206343] N83-10307
NONLINEAR EQUATIONS
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827
On scattering and everywhere defined scattering operators for nonlinear Klein-Gordon equations
[CTH-MATH-1982-09] N83-10859
NONLINEAR PROGRAMMING
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876
NONLINEAR SYSTEMS
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
Effective dynamic reanalysis of large structures
N83-10259
On nonlinear response of multiple blade systems
N83-10261
Fault diagnosis of nonlinear analog circuit. Volume 2: A multifrequency method for soft failure analysis
[AD-A117568] N83-10358
Nonlinear analysis of beams. Part 1: A Survey of recent advances N83-10436
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
Correlation and moment properties relating numerical integration and stochastic integrals
[DE82-016088] N83-10855
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876
Studies of bistable optical devices
[AD-A117755] N83-10905
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942
NONLINEARITY
Experience of non-linear high incidence aerodynamic characteristics N83-10070
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071
NONPARAMETRIC STATISTICS
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870
NORMALIZING (STATISTICS)
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924
NOZZLE FLOW
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386
NUCLEAR EXPLOSION EFFECT
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive
N83-10249
NUCLEAR EXPLOSIONS
Seismic discrimination
[AD-A116884] N83-10686
NUCLEAR FUSION
Stability and disturbance of large dc superconducting magnets
[DE82-012388] N83-10879
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] N83-10920
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922
NUCLEAR HEAT
Steam gasification of coal, project prototype plant nuclear process heat: Report at the end of the reference phase
[BMFT-FB-T-82-069] N83-10616
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] N83-10625
NUCLEAR POWER PLANTS
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
NUCLEAR REACTOR CONTROL
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] N83-10928
NUCLEAR REACTORS
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947
NUCLEATE BOILING
Stability and disturbance of large dc superconducting magnets
[DE82-012388] N83-10879
NUCLEATION
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
The removal of non-metallic inclusions from steel
[BLL-M26519] N83-10164
NUMBER THEORY
KWIC index for numerical algebra
[DE82-008144] N83-10790
NUMERICAL ANALYSIS
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
What is stiffness?
[DE82-017639] N83-10854
NUMERICAL CONTROL
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243
NUMERICAL FLOW VISUALIZATION
Acta Aeronautica et Astronautica Sinica
[AD-A117465] N83-10003
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
NUMERICAL INTEGRATION
Correlation and moment properties relating numerical integration and stochastic integrals
[DE82-016088] N83-10855
NUMERICAL WEATHER FORECASTING
The federal plan for meteorological services and supporting research, fiscal year 1983
[PB82-215708] N83-10725
NUSSELT NUMBER
A study of dropwise and film condensation under variable gravity fields N83-10385
NUTRIENTS
Vertical mixing and nutrient transport in the Chesapeake Bay
[PB82-178708] N83-10748

O

O STARS
The peculiar extinction of Herschel 36
[NASA-TM-84893] N83-10998
OCEAN BOTTOM
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
OCEAN COLOR SCANNER
Analysis of high altitude remotely sensed data collected in the Nantucket Shoals experiment 4-15 May, 1981
[NASA-TM-84547] N83-10647

OCEAN CURRENTS
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
OCEAN DYNAMICS
Variability in the mixed layer depth near the polar front
[AD-A117154] N83-10737
OCEAN MODELS
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
OCEAN SURFACE
Variability in the mixed layer depth near the polar front
[AD-A117154] N83-10737
OCEAN TEMPERATURE
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743
OCEAN THERMAL ENERGY CONVERSION
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory
[PB82-215054] N83-10639
OCEANOGRAPHIC PARAMETERS
USSR report: Earth sciences, no. 23
[JPRS-81965] N83-10713
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
Variability in the mixed layer depth near the polar front
[AD-A117154] N83-10737
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project
[PB82-215815] N83-10742
OCEANOGRAPHY
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182682] N83-10747
OCEANS
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
Ocean dumping monitoring and research, January through December 1979
[PB82-176231] N83-10671
Ocean pollution research, development and monitoring
[PB82-219049] N83-10740
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182682] N83-10747
OFFSHORE PLATFORMS
Shaking table tests of a tubular steel frame model
[PB82-220161] N83-10277
OIL FIELDS
Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] N83-10479
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
OIL RECOVERY
Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] N83-10479
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] N83-10705
OILS
National Seminar on Current Advances in the Technology of Oils and Allied Product
[PB82-218124] N83-10201
ONBOARD DATA PROCESSING
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325
ONBOARD EQUIPMENT
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program
N83-10244
EDESS: An electromagnetically-driven explosive-shock simulator --- generating explosive-like shocks in shipboard equipment N83-10245
OPERATING COSTS
PV large systems project N83-10512
OPERATING SYSTEMS (COMPUTERS)
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Efficient FORTRAN programming practice
[RR-182] N83-10834
OPERATOR PERFORMANCE
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776
OPERATORS (MATHEMATICS)
KWIC index for numerical algebra
[DE82-008144] N83-10790
On scattering and everywhere defined scattering operators for nonlinear Klein-Gordon equations
[CTH-MATH-1982-09] N83-10859
OPTICAL COMMUNICATION
Airborne Flight Test System (AFTS)
[AD-A115100] N83-10330
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904
OPTICAL DATA PROCESSING
A modified adaptive delta modulator for video data compression N83-10317
OPTICAL EMISSION SPECTROSCOPY
Quasielastic light scattering from dilute and semidilute polymer solutions
[DE82-016806] N83-10197
OPTICAL EQUIPMENT
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112
Studies of bistable optical devices
[AD-A117755] N83-10905
OPTICAL FILTERS
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test
[AD-A115052] N83-10769
OPTICAL MEASUREMENT
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
Measuring the microtopography of optical surfaces
N83-11016
OPTICAL PROPERTIES
A combined optical/microwave approach to crop classification N83-10457
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
OPTICAL RADAR
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado
[PB82-215070] N83-10711
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] N83-10908
OPTICS
Phase conjugate optics and its potential applications
[AD-A117468] N83-10906
OPTIMAL CONTROL
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079
Controllability, optimal control and receding horizon control of distributed multipass processes
[RR-181] N83-10853
OPTIMIZATION
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010
A method for estimating the error induced by the Guyan Reduction N83-10256
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10278
Optimal design of multiple tube grain and their arrangement
[AD-A117545] N83-10362
Optimization of composite structures
[NASA-TM-84544] N83-10447
Sparse linear programming subprogram
[DE82-011783] N83-10826
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876
The Application of Traffic Simulation Models
[PB82-207226] N83-10992
ORBIT CALCULATION
Adaptive estimation of state noise in a Kalman filter
[INPE-2440-PRE/141] N83-10352
ORBIT TRANSFER VEHICLES
Manned geosynchronous mission requirements and systems analysis study add-on
[NASA-CR-167741] N83-10092
ORBITS
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098
ORDER-DISORDER TRANSFORMATIONS
Studies of chemical adsorption using low energy electron diffraction N83-10130
OREGON
Water resources data for Oregon water year 1930. Volume 1: Eastern Oregon
[PB82-190356] N83-10491
ORGANIC COMPOUNDS
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds
[DE82-015855] N83-10116
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140
Fugitive emission sources of organic compounds: Additional information on emissions, emission reductions, and costs
[PB82-217126] N83-10657
ORGANIC SULFUR COMPOUNDS
A systematic investigation of the organosulfur components in coal N83-10575
ORGANISMS
The ecology of New England tidal flats: A community profile
[PB82-217100] N83-10659
ORIFICE FLOW
Orifice plate design studies for a multiple-compartment, ion-exchange column
[PB82-201310] N83-10155
ORTHOGONALITY
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
ORTHOTROPIC PLATES
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452
The stress distribution around an infinite row of circular holes in an orthotropic plate
[VTH-LR-340] N83-10453
OSCILLATING FLOW
Bifurcation and stability of propagating oscillation flames N83-10129
OSCILLATIONS
An example of longitudinal and transversal oscillation coupling: The Epsilon aircraft cork screw N83-10074
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
Effect of a damper on the wind-induced oscillations of a tall mast
[UTIAS-257] N83-10273
OSS-1 PAYLOAD
STS-3, busiest and most successful test mission
[NASA-TM-84864] N83-10105
OUTPUT
Estimated capacity of US ethanol plants
[PB82-203647] N83-10154
OXIDATION
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
Synthesis of perfluorinated polyethers --- for sealers
[NASA-CR-166409] N83-10195
An introduction to chemiluminescence methods for lubricant oxidation studies
[PB82-207515] N83-10199

OXIDE FILMS
A critical study of the role of the surface oxide layer in titanium bonding
[NASA-CR-169457] N83-10174
OXIDES
High temperature grain boundary cavitation in oxide dispersed copper N83-10168
The electrical properties of the anodic oxide/GaAs interface N83-10356
OXYGEN
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580
Io: Escape and ionization of atmospheric gases
[NASA-CR-169443] N83-11004
OXYGEN BREATHING
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 2: Detailed program descriptions, listings, examples and hardware specifications
[NASA-CR-167737] N83-10760
OXYGEN CONSUMPTION
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762
OXYGEN IONS
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003
OXYGENATION
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757
OXYHALIDES
Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] N83-10504
OZONE
The influence of the atmospheric ozone layer on the formation of layer D of the ionosphere at sunrise
[INPE-2487-PRE/171] N83-10679
The National Plan for Stratospheric Ozone Monitoring and Early Detection of Change, 1981 - 1986
[PB82-203159] N83-10706
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789

P

P WAVES
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
P-N JUNCTIONS
Methods for investigating the properties of polycrystalline silicon p-n junction solar cells N83-10565
PACIFIC OCEAN
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743
PACKAGING
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153
PACKETS (COMMUNICATION)
Acquisition, image and data compression --- packet communications
[AD-A117737] N83-10904
PAINTS
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings
[NASA-TM-82499] N83-10113
National Seminar on Current Advances in the Technology of Oils and Allied Product
[PB82-218124] N83-10201
PAKISTAN
Energy for agriculture in Pakistan
[IIASA-RR-82-20] N83-10499
PANELS
Effect of stiffener arrangement on the random response of a flat panel N83-10260
Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine
[NASA-CR-165962] N83-10379
PARABOLIC DIFFERENTIAL EQUATIONS
Numerical solution of linear parabolic partial differential equation with infinite range for space variable
[PB82-188905] N83-10864
PARABOLIC REFLECTORS
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator N83-10526
Thin film concentrator panel development N83-10529
Commercialization of parabolic dish systems N83-10540
A point focusing collector for an integrated water/power complex N83-10541
The French thermo-helio-electricity-KW parabolic dish program N83-10542
Configuration selection study for isolated loads using parabolic dish modules N83-10548
An economic evaluation of solar energy N83-10549
Panel discussions: Industrial support sector requirements N83-10550
Designing the manifold piping for parabolic-trough-collector fields
[DE82-015998] N83-10599
Tests with concentrating collectors --- construction, evaluation and qualification of parabolic solar absorbers
[BMFT-FB-T-82-104] N83-10626
PARABOLOID MIRRORS
Acurex Parabolic Dish Concentrator (PDC-2) N83-10527
PARALYSIS
Feedback information and analysis for microprocessor controlled muscle stimulation
[AD-A115532] N83-10767
PARAMAGNETIC RESONANCE
Paramagnetic resonance studies of crystals N83-10965
PARAMETER IDENTIFICATION
Statistical estimation of liquid propellent rocket engine parameters N83-10011
PARAMETERIZATION
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472
PARTIAL DIFFERENTIAL EQUATIONS
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827
PARTICLE ACCELERATION
On the origin of relativistic particles and gamma-rays in quasars
[NASA-TM-83983] N83-11011
PARTICLE ACCELERATOR TARGETS
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931
PARTICLE ACCELERATORS
Report of the subpanel on long-range planning for the US High-Energy-Physics Program of the High-Energy-Physics Advisory Panel
[DE82-012502] N83-10898
PARTICLE COLLISIONS
Production and experimental study of the dissipative trapped ion instability N83-10910
PARTICLE EMISSION
Control of NO sub x by combustion process modifications
[PB82-180175] N83-10669
PARTICLE SIZE DISTRIBUTION
In-situ aerodynamic sizing of aerosol particles with the SPART analyzer
[PB82-197195] N83-10412
PARTICLE THEORY
Some calculator programs for particle physics
[DE82-012362] N83-10895
PARTICLES
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407
PARTITIONS (MATHEMATICS)
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
PASSIVITY
Passive stabilization of satellites by gravity gradient
[INPE-2462-PRE/154] N83-10096
PATENT POLICY
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 1: Abstracts
[NASA-SP-7039(21)-SECT-1] N83-10978
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 2: Abstracts
[NASA-SP-7039(21)-SECT-2] N83-10979
PATENTS
Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] N83-10494
PATTERN RECOGNITION
Some spectral and spatial characteristics of LANDSAT data N83-10461
Photointerpretation of LANDSAT images N83-10462
Computer processed LANDSAT data N83-10463
Appendix B: Principles of computer processing of LANDSAT data N83-10470
PATTERN REGISTRATION
Near surface observations N83-10464
PAVEMENTS
Aggregate microtexture: Profile measurement and related frictional levels
[PB82-202565] N83-10124
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288
Low cost pavement marking materials based on plasticized sulfur
[PB82-217969] N83-10289
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293
Pavement roughness and skid properties
[PB82-212309] N83-10295
PENETRATION
A study of the electromagnetic fields distribution inside buildings with apertures excited by an external source
[PB82-193418] N83-10341
PERCOLATION
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128
PERFLUORO COMPOUNDS
Use of organofluorine compounds
[NRC/CNR-TT-2027] N83-10115
Synthesis of perfluorinated polyethers --- for sealers
[NASA-CR-166409] N83-10195
PERFORATED PLATES
The stress distribution around an infinite row of circular holes in an orthotropic plate
[VTH-LR-340] N83-10453
PERFORMANCE PREDICTION
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
Simulation for predicting flying qualities N83-10080
Program to predict performance of a gas gun
[DE82-007644] N83-10088
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776
PERFORMANCE TESTS
Airborne Flight Test System (AFTS)
[AD-A115100] N83-10330
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico N83-10534
Recent tests on the Carter small reciprocating steam engines N83-10536
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
Dish Stirling system integration and test progress report N83-10539
Ceramic high temperature receiver design and tests N83-10544
PERIODIC FUNCTIONS
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
PERMEABILITY
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
PERSONALITY TESTS
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

PERSONNEL
Health effects of low level radiation in shipyard workers
[DE82-001112] N83-10770
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780
PERTURBATION THEORY
Singular perturbation aspects of kinetic equations N83-10913
PETROLEUM PRODUCTS
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211
Potential benefits from a successful solar thermal program N83-10547
PHASE CONJUGATION
Phase conjugate optics and its potential applications
[AD-A117468] N83-10906
PHASE CONTROL
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
PHASE SHIFT
Direct aircraft velocity determination by L-band moving target detector radar
[AD-A117512] N83-10031
PHASE SHIFT CIRCUITS
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz
[INPE-2463-PRE/155] N83-10326
PHASE SHIFT KEYING
Modulation techniques
[NASA-CR-169460] N83-10329
PHASE TRANSFORMATIONS
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091
Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] N83-10143
Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] N83-10146
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193
One dimensional multi-phase moving boundary problems with phases of different densities
[DE82-010324] N83-10395
PHOSPHORIC ACID FUEL CELLS
On the 40kW test power plant modification and development, phase 2
[PB82-216102] N83-10637
PHOTOABSORPTION
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789
PHOTOCHEMICAL REACTIONS
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
PHOTOCONDUCTIVITY
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567
Carrier transport in amorphous silicon utilizing picosecond photoconductivity N83-10960
PHOTOCONDUCTORS
Magnetooptical light switches in electrophotographic printers
[BMFT-FB-T-82-092] N83-10410
PHOTOELECTRON SPECTROSCOPY
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892
PHOTOGRAMMETRY
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
PHOTOINTERPRETATION
Familiarization with LANDSAT imagery N83-10460
Photointerpretation of LANDSAT images N83-10462
Appendix C. LANDSAT: A worldwide perspective N83-10471
PHOTOIONIZATION
Plasma physics aspects of the solar neutrino problem N83-10912
PHOTOLUMINESCENCE
Low temperature photoluminescence studies of shallow electronic states in semiconductors N83-10959
PHOTOMAPS
Familiarization with LANDSAT imagery N83-10460
Photointerpretation of LANDSAT images N83-10462
PHOTOMASKS
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284
PHOTOMETERS
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757
PHOTOMULTIPLIER TUBES
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889
The plasma current multiplier
[UTIAS-256] N83-10923
PHOTONS
Photon induced reactions --- future medium energy nuclear reactions
[BONN-HE-82-7] N83-10899
PHOTONUCLEAR REACTIONS
Photon induced reactions --- future medium energy nuclear reactions
[BONN-HE-82-7] N83-10899
PHOTOSYNTHESIS
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482
PHOTOTHERMAL CONVERSION
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator N83-10526
Acurex Parabolic Dish Concentrator (PDC-2) N83-10527
The PKI collector N83-10528
Thin film concentrator panel development N83-10529
A transmittance-optimized, point-focus Fresnel lens solar concentrator N83-10530
The small community solar thermal power experiment N83-10531
Development status of the small community solar power system N83-10532
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533
PHOTOTRANSISTORS
Phototransistor switch for breaker applications
[DE82-904374] N83-10367
PHOTOVOLTAIC CELLS
FSAs future role N83-10507
Engineering sciences area and module performance and failure analysis area N83-10523
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553
The fabrication and evalution of a silicon photovoltaic cell with a directly nitrided tunnel insulator N83-10564
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] N83-10597
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Intermediate photovoltaic system application experiment operational performance. Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] N83-10608
PHOTOVOLTAIC CONVERSION
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
National photovoltaic program N83-10506
Advanced Czohcralski ingot growth N83-10509
Block 5 module design summary N83-10510
Central-station applications: System and subsystem research activities N83-10511
PV large systems project N83-10512
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513
PV history: Lessons for the future N83-10514
Rooftop applications N83-10515
Photovoltaic research needs industry perspective N83-10516
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive N83-10517
Evaluation of advanced R and D topics in photovoltaics N83-10518
PHOTOVOLTAIC EFFECT
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] N83-10555
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607
PHYSICAL EXERCISE
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749
PHYSICAL PROPERTIES
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
PHYSIOLOGICAL EFFECTS
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762
PHYSIOLOGICAL RESPONSES
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749
PIEZOELECTRICITY
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493
PILOT ERROR
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022
PILOT PERFORMANCE
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results
[NASA-TM-84258-PT-1] N83-10049
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 2: Supporting data
[NASA-TM-84258-PT-2] N83-10050
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079
PILOT PLANTS
Coal preparation and testing N83-10573
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] N83-10625
PILOT TRAINING
An analysis of airline landing flare data based on flight and training simulator measurements
[NASA-CR-166404] N83-10047
PILOTS
Two landings
[AD-A117466] N83-10783
PILOTS (PERSONNEL)
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786
PIPE FLOW
Rain fall data for the design of sewer pipe systems
[PB82-187212] N83-10299
Programme system GANESI. Documentation report 1: Operating instructions
[BLL-T5870/BGLRS/T586(9022.048)] N83-10377
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888
PIPES (TUBES)
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205

Analysis of energy-absorbing shock mounts N83-10246
Shaking table tests of a tubular steel frame model [PB82-220161] N83-10277
Rain fall data for the design of sewer pipe systems [PB82-187212] N83-10299
Development and experimental evaluation of a steel tube vehicle impact attenuation system [PB82-182684] N83-10300
Determination of friction coefficients on several distant heat pipe sections with different sliding partners --- static friction measurement of flat bearings [BMFT-FB-T-82-095] N83-10397
Designing the manifold piping for parabolic-trough-collector fields [DE82-015998] N83-10599

PISTON ENGINES
Recent tests on the Carter small reciprocating steam engines N83-10536
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications [NASA-CR-165274] N83-10568

PITCH (INCLINATION)
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
The status of military helicopter handling qualities criteria N83-10065

PITCHING MOMENTS
Handling qualities criteria for longitudinal control N83-10062

PL/1
Six language extensions to enhance the portability of mathematical software written in PL/I: Background and justification [DE82-017660] N83-10832

PLANAR STRUCTURES
Optimal design of seismic resistant planar steel frames [PB82-220179] N83-10279

PLANE STRAIN
Measuring plane states of stress with regular strain gauge rosettes [CSIR-ME-1731] N83-10443
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446

PLANETARY ATMOSPHERES
Io: Escape and ionization of atmospheric gases [NASA-CR-169443] N83-11004
Other satellite atmospheres: Their nature and planetary interactions [NASA-CR-169439] N83-11005

PLANETARY WAVES
The determination of geoidal waves using spherical harmonics [INPE-2399-TDL/087] N83-10676

PLANKTON
Sunlight induced movement of planktonic organisms and their relationships to water movements [PB82-211509] N83-10660
Vertical mixing and nutrient transport in the Chesapeake Bay [PB82-178708] N83-10748

PLANNING
Development of meteorological scenarios for air quality planning using multivariate statistical analysis of meteorological and air quality data N83-10644
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985 [PB82-218462] N83-10656

PLANT DESIGN
First full-scale flotation plant in the USA for portable water treatment [PB82-220690] N83-10653

PLASMA CONTROL
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos [IPPJ-587] N83-10920
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems [IPPJ-577] N83-10922
Study of ion beam-initiated inertial-confinement fusion [DE82-013935] N83-10931
RAYS: A geometrical optics code for EBT [DE82-013391] N83-10936
Radial transport, end loss, and ambipolarity in tandem mirrors [DE82-019546] N83-10955

PLASMA CURRENTS
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak [IPPJ-594] N83-10919
The plasma current multiplier [UTIAS-256] N83-10923

PLASMA DENSITY
External ionization mechanisms for advanced thermionic converters N83-10496
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] N83-10935

PLASMA DIAGNOSTICS
Dye-laser development for plasma magnetic-field diagnostic [DE82-016421] N83-10421
Measurement of electron cyclotron emission from JIPP T-11 plasma [IPPJ-596] N83-10918
Measurements of fusion reactions from a Tokamak plasma --- plasma diagnostics N83-10926
Charge-capture experiments for plasma ions and neutral atoms [DE82-014502] N83-10954

PLASMA DRIFT
Consistent guiding center drift theories [IPP-6/212] N83-10914
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924
Instabilities driven by the parallel variation of the electrostatic potential in tandems [DE82-018409] N83-10941
Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] N83-10952

PLASMA DYNAMICS
Consistent guiding center drift theories [IPP-6/212] N83-10914
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration [DE82-017396] N83-10935

PLASMA EQUILIBRIUM
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation [DE82-008142] N83-10807
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak [IPPJ-594] N83-10919
Radial effects in heating and thermal stability of a sub-ignited Tokamak [DE82-009384] N83-10932
Parametric systems analysis of the Modular Stellarator Reactor (MSR) [DE82-016244] N83-10945

PLASMA GENERATORS
Rippling modes in the edge of a Tokamak plasma [DE82-007724] N83-10940

PLASMA HEATING
Self consistent loop antenna theory [IPP-4/205] N83-10319
Antenna-plasma coupling theory for ICRF heating of large tokamaks [DE82-013226] N83-10933
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak [DE82-017127] N83-10934
Wildcat: A catalyzed D-D Tokamak reactor [DE82-013712] N83-10938
Description of the Fokker-Plank code used to model ECRH of the Constance 2 plasma [DE82-007912] N83-10950

PLASMA LAYERS
Stability of propagating long ion ring layer [IPPJ-604] N83-10915

PLASMA PHYSICS
Dye-laser development for plasma magnetic-field diagnostic [DE82-016421] N83-10421
Plasma physics aspects of the solar neutrino problem N83-10912
Consistent guiding center drift theories [IPP-6/212] N83-10914
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos [IPPJ-587] N83-10920
US-Japan Workshop on Burning Plasma Physics and Engineering [IPPJ-599] N83-10921
Charge-capture experiments for plasma ions and neutral atoms [DE82-014502] N83-10954

PLASMA PROPULSION
Pulsed inductive thruster development (Advanced electric propulsion technology: High thrust). Volume 2. Supplement [AD-A117797] N83-10114

PLASMA SHEATHS
Rippling modes in the edge of a Tokamak plasma [DE82-007724] N83-10940

PLASMA SPRAYING
Further industrial tests of ceramic thermal barrier coatings [NASA-TP-2057] N83-10045

PLASMA TURBULENCE
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924

PLASMA WAVES
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924

PLASMA-PARTICLE INTERACTIONS
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam [DE82-008441] N83-10944

PLASMAGUIDES
Sausage instability of Z-discharged plasma channel in LIB-fusion device [IPPJ-602] N83-10917

PLASMAS (PHYSICS)
Technology spin-offs from the magnetic fusion energy program [DE82-016923] N83-10897
Production and experimental study of the dissipative trapped ion instability N83-10910
Experimental investiation of neutral plasma beam propagation across a magnetic field [AD-A117765] N83-10927
Fusion reactor plasma-performance modeling: POPCON analysis [DE82-016364] N83-10943
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam [DE82-008441] N83-10944
Observations of plasma rotation in the high-beta Tokamak Torus 2 [DE82-019373] N83-10952
Temperature limit in ECH hot electron plasmas [DE82-015820] N83-10956
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas [DE82-008146] N83-10957

PLASTIC DEFORMATION
Mechanical bonding of metal method [NASA-CASE-LEW-12941-1] N83-10170
Forming techniques and procedures [PB82-289002] N83-10298
Mathematical programming in plastic analysis N83-10444

PLASTIC PROPERTIES
An investigation of the effect of aggregate on concrete compressible strength [PB82-212457] N83-10291

PLASTICS
Mathematical programming in plastic analysis N83-10444

PLATES
Orifice plate design studies for a multiple-compartment, ion-exchange column [PB82-201310] N83-10155

PLATES (STRUCTURAL MEMBERS)
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008

PLATING
Method for depositing an oxide coating [NASA-CASE-LEW-13131-1] N83-10494

PLATINUM
Properties of Pt supported on oxides of titanium [AD-A117892] N83-10139
Electrochemical studies of platinum-group metals in molten alkali metal cyanides [PB82-202243] N83-10190

PLOTTING
GRAF11: X-Y graph generation library [DE82-016320] N83-10813
Functional specification of the Sandia Virtual Device Interface (SVDI) [DE82-014522] N83-10818
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods [DE82-013341] N83-10828

PLUMES
Coupled near and far field thermal plume analysis using finite element techniques [PB82-180316] N83-10667
Behavior of buoyant moist plumes in turbulent atmospheres [PB82-180241] N83-10668

PLUNGERS
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030 [NASA-TM-82497] N83-10094
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame [AD-A117470] N83-10427

PLUTONIUM
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
PLYWOOD
Tannin adhesives: From laboratory to industry
[PB82-206814] N83-10203
PNEUMATIC CONTROL
Pneumatic vibration control using active force generators N83-10226
PNEUMATIC EQUIPMENT
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617
Dry processing of power plant coal rich in inerts --- use of air classifier for dry upgrading of coal with high inerts content
[BMFT-FB-T-82-101] N83-10631
POLAR REGIONS
Variability in the mixed layer depth near the polar front
[AD-A117154] N83-10737
POLARIMETERS
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953
POLARITY
Radial transport, end loss, and ambipolarity in tandem mirrors
[DE82-019546] N83-10955
POLICIES
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182882] N83-10747
POLLUTION CONTROL
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2
[BMFT-FB-T-82-108] N83-10652
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
POLYCARBONATES
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200
POLYCRYSTALS
Investigation of large diameter polycrystalline crucible shaped InP
[AD-A117739] N83-10137
Union Carbide Corp. polysilicon status and plans N83-10508
Methods for investigating the properties of polycrystalline silicon p-n junction solar cells N83-10565
POLYESTERS
Study of energy loss during a fracture event N83-10438
POLYETHER RESINS
Synthesis of perfluorinated polyethers --- for sealers
[NASA-CR-166409] N83-10195
POLYETHYLENES
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205
POLYIMIDE RESINS
Lower-curing-temperature PMR polyimides
[NASA-TM-82958] N83-10118
POLYMER CHEMISTRY
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193
POLYMER PHYSICS
Quasielastic light scattering from dilute and semidilute polymer solutions
[DE82-016806] N83-10197
POLYMERIC FILMS
Thin film concentrator panel development N83-10529
POLYMETHYL METHACRYLATE
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
POLYNOMIALS
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262
A numerical investigation of some quadratic polynomials containing a high density of primes, part 1
[FOA-C-10195-M8] N83-10862
POLYSTYRENE
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
POLYURETHANE FOAM
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200
POROSITY
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134
Turbulent boundary layer over solid and porous surfaces with small roughness
[NASA-CR-3612] N83-10383
PORTABLE EQUIPMENT
Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] N83-10207
POSITION INDICATORS
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424
POSTLAUNCH REPORTS
Post launch report on the heat capacity mapping mission
[NASA-TM-84859] N83-10095
A free people capable of great deeds, the story of STS-1, the first Space Shuttle mission
[NASA-TM-84863] N83-10106
POSTMISSION ANALYSIS (SPACECRAFT)
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-826] N83-10107
POTASSIUM COMPOUNDS
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
POTENTIAL FLOW
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403
POWDERED ALUMINUM
Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] N83-10614
POWER CONDITIONING
Rooftop applications N83-10515
Garrett solar Brayton engine/generator status N83-10545
Power conditioning subsystem design
[AD-A117736] N83-10569
POWER LIMITERS
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF)
[INPE-2451-RPE/412] N83-10964
POWER LINES
Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] N83-10370
POWER SPECTRA
The mean and variance of skywave radar sea-echo power spectra
[PB82-175969] N83-10744
POWER SUPPLIES
Protection of large capacitor banks
[DE82-017353] N83-10366
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] N83-10368
Garrett solar Brayton engine/generator status N83-10545
Power conditioning subsystem design
[AD-A117736] N83-10569
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Intermediate photovoltaic system application experiment operational performance. Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] N83-10608
PREAMPLIFIERS
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz
[INPE-2463-PRE/155] N83-10326
PRECIPITATION (METEOROLOGY)
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1
[PB82-202805] N83-10721
Modification of Palmer drought index
[PB82-181751] N83-10731
PRECIPITATION PARTICLE MEASUREMENT
In-situ aerodynamic sizing of aerosol particles with the SPART analyzer
[PB82-197195] N83-10412
PREDICTION ANALYSIS TECHNIQUES
Present status of flying qualities criteria for conventional aircraft --- military specifications transfer functions N83-10055
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
PREDICTIONS
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
PRELAUNCH SUMMARIES
Mission operation report. RCA-E/Delta launch
[NASA-TM-84869] N83-10097
PREPROCESSING
Appendix A: The LANDSAT system N83-10469
Appendix B: Principles of computer processing of LANDSAT data N83-10470
PRESIDENTIAL REPORTS
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182882] N83-10747
PRESSES
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame
[AD-A117470] N83-10427
PRESSURE DISTRIBUTION
Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces
[NASA-TM-84490] N83-10017
PRESSURE MEASUREMENT
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735
PRESSURE OSCILLATIONS
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272
PRESSURE PULSES
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249
PRESSURE REDUCTION
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882
PRINTERS
Introduction of an electron beam maskprinter system for LSI maskmaking
[BMFT-FB-T-82-110] N83-10371
PRISMS
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900
PROBABILITY DENSITY FUNCTIONS
Wind power potential in Belgium
[PUBL-SER-B-115] N83-10563
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870
PROBABILITY THEORY
Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems
[DE82-007990] N83-10869
PROBE METHOD (FORECASTING)
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
PROBLEM SOLVING
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010

VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815
Sparse linear programming subprogram
[DE82-011783] N83-10826
Arithmetical quadratic surfaces of Genus 0, 2
[CTH-MATH-1982-10] N83-10861
Numerical solution of linear parabolic partial differential equation with infinite range for space variable
[PB82-188905] N83-10864
Comparative system model validation using four optimization algorithms
[NIAST-81/124] N83-10877

PROCEEDINGS
Copper Powder and Chemicals: Edited proceedings of a seminar
[PB82-206202] N83-10192

PROCESS CONTROL (INDUSTRY)
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178
Improved speed control law for a sinter strand process
[RR-184] N83-10179
Flat-plate collector research area: Silicon material task N83-10519
Project analysis and integration area N83-10524
Controllability, optimal control and receding horizon control of distributed multipass processes
[RR-181] N83-10853

PROCESS HEAT
Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] N83-10146
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas N83-10535
Urban waste as a potential source for brick plants N83-10591
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] N83-10625

PROCESSING
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211

PROCUREMENT POLICY
Department of Defense policy on reliability and maintainability N83-10219

PRODUCT DEVELOPMENT
Telecommunication in power systems using optical fibre cells
[BMFT-FB-T-82-082] N83-10336
High resolution, broad spectral band radiometer
[INPE-2480-TDL/098] N83-10405
Photovoltaic research needs industry perspective N83-10516
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive N83-10517
Development of an eight-bit microprocessor component family in CMOS technology --- R and D in miniaturization of microprocessor components
[BMFT-FB-T-82-089] N83-10796
Development of a single chip microprocessor in CMOS silicon gate technology. Further development of four bit microprocessor concept in CMOS technology
[BMFT-FB-T-82-088] N83-10797
Research in space commercialization, technology transfer, and communications
[NASA-CR-169447] N83-10972

PRODUCTIVITY
Software Engineering, 7th Seminar
[AD-A117995] N83-10811
Efficient FORTRAN programming practice
[RR-182] N83-10834

PROGRAM VERIFICATION (COMPUTERS)
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
Theory of testing computer programs N83-10805
Guidelines for technical reviews of software products
[DE82-013411] N83-10830

PROGRAMMING LANGUAGES
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817
Software tools and more for Modcomp computers
[DE82-007985] N83-10823
Interactive language characteristics for a data dictionary system
[PB82-203696] N83-10837

PROJECT MANAGEMENT
The small community solar thermal power experiment N83-10531
Small-scale waste-to-energy systems: A state-of-the-art report N83-10583
COPLAN, an interactive system for project management
[INPE-2456-PRE/151] N83-10971

PROJECT PLANNING
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513
PV history: Lessons for the future N83-10514
The federal plan for meteorological services and supporting research, fiscal year 1983
[PB82-215708] N83-10725
Report of the subpanel on long-range planning for the US High-Energy-Physics Program of the High-Energy-Physics Advisory Panel
[DE82-012502] N83-10898
COPLAN, an interactive system for project management
[INPE-2456-PRE/151] N83-10971
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973

PROJECTILES
Program to predict performance of a gas gun
[DE82-007644] N83-10088

PROJECTIVE GEOMETRY
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876

PROPAGATION MODES
Stability of propagating long ion ring layer
[IPPJ-604] N83-10915

PROPAGATION VELOCITY
Notes on the unsteady rectilinear motion of a perfect gas. Part 5: A nonuniformly traveling shock wave in an LMS gas
[VTH-LR-328] N83-10398

PROPELLANT GRAINS
Optimal design of multiple tube grain and their arrangement
[AD-A117545] N83-10362

PROPELLANT TANKS
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091

PROTECTION
Automatic Repeat Query (ARQ), Forward Error Corrector (FEC), and hybrid protection systems
[DM51/BR-JP/0598-82] N83-10339

PROTECTIVE COATINGS
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
The use of therml sprayed coatings to combat atmospheric corrosion in the building and construction industry
[PB82-185836] N83-10182
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185
National Seminar on Current Advances in the Technology of Oils and Allied Product
[PB82-218124] N83-10201
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610

PROTONS
Measurements of fusion reactions from a Tokamak plasma --- plasma diagnostics N83-10926

PROTOTYPES
Evaluation of new Iroquois torquemeter PN 73-30-1
[AD-A117747] N83-10042

PROVING
Airport landside. Volume 3. ALSIM calibration and validation
[AD-A117601] N83-10085
Validation summary report NCR Corporation V8570 VRX COBOL 30
[PB82-185554] N83-10798
Gould concept 32/87, COBOLT release 1.2
[PB82-182486] N83-10800
Gould concept 32/87, COBOL release 1.2
[PB82-182494] N83-10801

PROXIMITY EFFECT (ELECTRICITY)
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424

PSYCHOLOGICAL TESTS
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

PUBLIC HEALTH
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663

PULSE CODE MODULATION
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337

PULSE COMMUNICATION
Modulation techniques
[NASA-CR-169460] N83-10329
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337

PULSES
Optimizing pre- and post-pulses for shaker shock testing N83-10232
Development of a multiaxial force-pulse generator N83-10237
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010641] N83-10363
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers
[PB82-184086] N83-10641

PUMPING
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490

PURIFICATION
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649

PYRITES
Fossil-energy
[DE82-018269] N83-10570
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571
Physicochemical cleaning and recovery of coal N83-10577

PYROELECTRICITY
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567

PYROLYSIS
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
The heat capacity of coal chars N83-10206
Thermal reactor --- liquid silicon production from silane gas
[NASA-CASE-NPO-14369-1] N83-10501

PYROLYTIC GRAPHITE
Ion sputter textured graphite --- anode collector plates in electron tube devices
[NASA-CASE-LEW-12919-1] N83-10117

Q

QUADRATIC EQUATIONS
Arithmetical quadratic surfaces of Genus 0, 2
[CTH-MATH-1982-10] N83-10861
A numerical investigation of some quadratic polynomials containing a high density of primes, part 1
[FOA-C-10195-M8] N83-10862

QUALITATIVE ANALYSIS
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571

QUALITY CONTROL
Seminar on heat treatment and metallurgical quality control of forgings
[PB82-209438] N83-10184
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project
[PB82-215815] N83-10742
Guidelines for technical reviews of software products
[DE82-013411] N83-10830
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974

QUANTITATIVE ANALYSIS
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571
QUARTZ
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation
[BMFT-FB-T-82-096] N83-10144
QUASARS
Infrared properties of serendipitous X-ray quasars
[NASA-CR-169454] N83-10995
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001
On the origin of relativistic particles and gamma-rays in quasars
[NASA-TM-83983] N83-11011
QUENCHING (COOLING)
Magnetoelastic instabilities and vibrations of superconducting-magnet systems
[DE82-015206] N83-10880
QUEUEING THEORY
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
Approximate solutions to queueing networks with state dependent parameters N83-10847

R

RADAR
The mean and variance of skywave radar sea-echo power spectra
[PB82-175969] N83-10744
RADAR ANTENNAS
Transient response analysis of a large radar antenna N83-10265
End-fire hybrid array antennas
[AD-A117414] N83-10332
RADAR APPROACH CONTROL
Techniques for air traffic planning and handling in the terminal area
[DFVLR-MITT-82-04] N83-10032
RADAR BEACONS
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
RADAR ECHOES
The mean and variance of skywave radar sea-echo power spectra
[PB82-175969] N83-10744
RADAR EQUIPMENT
RF characterization of semiconductors
[DE82-016995] N83-10335
RADAR GEOLOGY
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
RADAR IMAGERY
Other remote sensing systems: Retrospect and outlook N83-10467
RADAR NAVIGATION
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations
[NASA-CR-166274] N83-10029
RADIAL FLOW
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968
RADIANCE
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932
RADIANT FLUX DENSITY
Methods to enhance blanket power density
[DE82-017467] N83-10958
RADIANT HEATING
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
RADIATION ABSORPTION
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789
RADIATION DAMAGE
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962
RADIATION DOSAGE
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
Health effects of low level radiation in shipyard workers
[DE82-001112] N83-10770
RADIATION EFFECTS
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
RADIATION HAZARDS
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
RADIATION MEASUREMENT
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber
[BMFT-FB-T-82-070] N83-10718
RADIATION SHIELDING
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889
RADIATION TOLERANCE
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
RADIATIVE TRANSFER
Other remote sensing systems: Retrospect and outlook N83-10467
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739
RADIO ALTIMETERS
Analysis of possible interference in radio altimeters induced by a position marker system called RASP
[NLR-TR-81135-U] N83-10043
RADIO BEACONS
Analysis of possible interference in radio altimeters induced by a position marker system called RASP
[NLR-TR-81135-U] N83-10043
RADIO FREQUENCIES
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations
[BBC-RD-1982/16] N83-10313
RF characterization of semiconductors
[DE82-016995] N83-10335
RADIO FREQUENCY HEATING
Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] N83-10933
RADIO RECEIVERS
AM receiver performance for 10 kHz signal spacings
[PB82-192576] N83-10342
RADIO SIGNALS
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
RADIO STARS
Infrared properties of serendipitous X-ray quasars
[NASA-CR-169454] N83-10995
RADIO TRANSMISSION
Automatic audio signing. Volume 1: Executive summary
[PB82-202953] N83-10282
Automatic audio signing. Volume 2: Review, analysis and design
[PB82-202961] N83-10283
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337
RADIO WAVES
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
RADIOACTIVE WASTES
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
RADIOACTIVITY
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020
RADIOMETERS
Imaging radiometry systems
[DE82-015862] N83-10364
High resolution, broad spectral band radiometer
[INPE-2460-TDL/096] N83-10405
Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer
[NASA-TM-83964] N83-10903
RADIOSONDES
Elevated duct data-base improvement
[PB82-215906] N83-10343
RAIN
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1
[PB82-202805] N83-10721
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2
[PB82-216581] N83-10730
RAINMAKING
FACE-1: The operational design and derivation of the basic and ancillary data sets
[PB82-215104] N83-10727
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2
[PB82-216581] N83-10730
RAINSTORMS
Rain fall data for the design of sewer pipe systems
[PB82-187212] N83-10299
RAMAN SPECTRA
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150
RANDOM LOADS
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452
RANDOM PROCESSES
Germ-Markov processes N83-10865
RANDOM VARIABLES
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870
RANDOM VIBRATION
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
RANKINE CYCLE
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533
RANKING
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311
RATES (PER TIME)
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304
RATS
Cardiovascular adaptations during long-term altered gravity
[NASA-CR-169438] N83-10750
RAYLEIGH NUMBER
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
RCA SATCOM SATELLITES
Mission operation report. RCA-E/Delta launch
[NASA-TM-84869] N83-10097
REACTION KINETICS
Experiments on continuum electron capture in atomic hydrogen and collisional interactions of trapped ions
[DE82-013939] N83-10891
REACTION PRODUCTS
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209
Ashing properties of coal blends N83-10572
REACTION TIME
Effect of control system delays on fighter flying qualities N83-10072
The use of dual task paradigms in memory research: A methodological assessment and an evaluation of effort as a measure of levels of processing
[AD-A115093] N83-10779

REACTOR DESIGN
Thermal reactor --- liquid silicon production from silane gas
[NASA-CASE-NPO-14369-1] N83-10501
REACTOR MATERIALS
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor
[BLL-CTO-2075-(9091.9F)] N83-10162
REACTOR STARTUP TESTS
Fusion reactor plasma-performance modeling: POPCON analysis
[DE82-016364] N83-10943
REAL TIME OPERATION
Adaptive estimation of state noise in a Kalman filter
[INPE-2440-PRE/141] N83-10352
RECIRCULATIVE FLUID FLOW
Turbulent transport modelling of separating and reattaching shear flows
[NASA-CR-169368] N83-10380
RECLAMATION
Copper Powder and Chemicals: Edited proceedings of a seminar
[PB82-206202] N83-10192
RECORDING INSTRUMENTS
Characterization of RDF properties through high pressure differential scanning calorimetry N83-10582
RECTANGULAR PLATES
On the vibration of fiber reinforced laminated plates N83-10009
RECTIFIERS
Power conditioning subsystem design
[AD-A117736] N83-10569
RECURSIVE FUNCTIONS
A rapidly recursive method for the B-splines N83-10015
An improved recursive formula for calculating shock response spectra N83-10251
Low noise computationally efficient methods in digital signal processing N83-10318
RECYCLING
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
RED SHIFT
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001
REDUCED GRAVITY
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091
REDUNDANCY
The simulation study on a redundant flight control system N83-10014
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101
REFERENCE STARS
Secondary standard stars for absolute spectrophotometry N83-11000
REFINING
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
Refining of military jet fuels from shale oil. Part 1. Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] N83-10210
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211
REFLECTANCE
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds
[DE82-015855] N83-10116
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610
Use of spectral data to estimate the relationship between soil moisture tensions and their corresponding reflectance
[PB82-224528] N83-10712
REFLECTED WAVES
Some fundamental concepts in remote sensing N83-10459
REFLECTION NEBULAE
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997
REFLECTOMETERS
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610
REFLECTORS
A generalized method for determining radiation patterns of aperture antennas and its application to reflector antennas
[NASA-CR-169449] N83-10324
REFRACTIVITY
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969
REFRACTORY COATINGS
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194
REFRACTORY MATERIALS
High-temperature corrosion resistance of basic refractories to coal and lignite ash slags
[PB82-201351] N83-10186
REGIONAL PLANNING
A case study in the practical use of LANDSAT data N83-10466
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973
REGRESSION ANALYSIS
Diagnostics for multiple-regression problems
[DE82-013629] N83-10795
Fitting multidimensional splines using statistical variable selection techniques
[NASA-CR-169363] N83-10867
REGULATIONS
The transportation of hazardous materials
[RV/1/81] N83-10990
REINFORCED PLASTICS
A short note on the compressive behaviour of aramid fibre reinforced plastics
[VTH-LR-341] N83-10122
REINFORCEMENT (STRUCTURES)
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442
REINFORCEMENT RINGS
The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263
REINFORCING FIBERS
A short note on the compressive behaviour of aramid fibre reinforced plastics
[VTH-LR-341] N83-10122
RELATIVISTIC PARTICLES
On the origin of relativistic particles and gamma-rays in quasars
[NASA-TM-83983] N83-11011
RELAXATION OSCILLATORS
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling
[RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling
[RR-187] N83-10754
RELIABILITY
The simulation study on a redundant flight control system N83-10014
Department of Defense policy on reliability and maintainability N83-10219
RELIABILITY ANALYSIS
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
Reliability and safety of power systems --- mathematical models
[BMFT-FB-T-82-080] N83-10432
Configuration selection study for isolated loads using parabolic dish modules N83-10548
Markov reliability models for repairable distributed systems N83-10839
RELIABILITY ENGINEERING
Department of Defense policy on reliability and maintainability N83-10219
Vibration test level criteria for aircraft equipment N83-10240
The cost of software fault tolerance
[NASA-TM-84546] N83-10806
RELIEF VALVES
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424
REMOTE CONSOLES
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768
REMOTE SENSING
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
A combined optical/microwave approach to crop classification N83-10457
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458
Some fundamental concepts in remote sensing N83-10459
Appendix C. LANDSAT: A worldwide perspective N83-10471
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481
Remote sensing, a tool for managing the marine environment: Eight case studies
[PB82-220864] N83-10483
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2
[PB82-216581] N83-10730
REMOTE SENSORS
Other remote sensing systems: Retrospect and outlook N83-10467
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739
REMOTELY PILOTED VEHICLES
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[MASAD-81-20] N83-10875
REPRODUCTION (COPYING)
Magnetooptical light switches in electrophotographic printers
[BMFT-FB-T-82-092] N83-10410
RESEARCH
Tannin adhesives: From laboratory to industry
[PB82-206814] N83-10203
Intercommunication between open networks
[PB82-205188] N83-10843
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882
Space research activities in Hungary, 1980 - 1981 N83-11014
RESEARCH AND DEVELOPMENT
National photovoltaic program N83-10506
Photovoltaic research needs industry perspective N83-10516
Evaluation of advanced R and D topics in photovoltaics N83-10518
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory
[PB82-184029] N83-10774
Allocating R and D resources: A study of the determinants of R and D by character of use
[PB82-209800] N83-10975
The DOD-NASA independent research and development program: Issues and methodology for an in-depth study
[PB82-192741] N83-10977
RESEARCH FACILITIES
Development of Egyptian instrumentation technology
[PB82-199845] N83-10411
Report of the subpanel on long-range planning for the US High-Energy-Physics Program of the High-Energy-Physics Advisory Panel
[DE82-012502] N83-10898
RESEARCH MANAGEMENT
Development of Egyptian instrumentation technology
[PB82-199845] N83-10411
Diagnostics for multiple-regression problems
[DE82-013629] N83-10795
RESERVOIRS
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
RESIDENTIAL ENERGY
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294

Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
Rooftop applications N83-10515
Community heat-pump system, Klamath County, Oregon
[DE82-015106] N83-10600
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Feasibility study of geothermal heating, Modoc Lassen housing project
[DE82-015099] N83-10611

RESIN MATRIX COMPOSITES
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120

RESINS
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119

RESOLUTION
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133

RESONANCE
Laboratory modeling and analysis of aircraft-lightning interactions
[NASA-CR-169455] N83-10023
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam
[DE82-008441] N83-10944

RESONANCE FLUORESCENCE
Dye-laser development for plasma magnetic-field diagnostic
[DE82-016421] N83-10421

RESONATORS
Hybrid microwave filters using interdigital and hairpin microstrip resonators
[INPE-2411-PRE/120] N83-10351
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
Microwave oscillator stabilized by a dielectric resonator at 5.4 GHz
[INPE-2436-PRE/137] N83-10355
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF)
[INPE-2451-RPE/412] N83-10964

RESOURCE ALLOCATION
COPLAN, an interactive system for project management
[INPE-2456-PRE/151] N83-10971
Allocating R and D resources: A study of the determinants of R and D by character of use
[PB82-209800] N83-10975

RESOURCES MANAGEMENT
A case study in the practical use of LANDSAT data N83-10466
Some closing thoughts: Practical payoffs from satellite systems N83-10468
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 N83-10588

RESPIRATION
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482

RESPIRATORS
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757

RESPIRATORY RATE
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757

RESPONSE TIME (COMPUTERS)
Time-sharing comparisons of several computers
[DE82-014514] N83-10841

RESPONSES
Effect of control system delays on fighter flying qualities N83-10072

RETENTION (PSYCHOLOGY)
The use of dual task paradigms in memory research: A methodological assessment and an evaluation of effort as a measure of levels of processing
[AD-A115093] N83-10779

RETROFITTING
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612

REVERBERATION
Parameters for design of reverberant acoustic chambers for testing air-carried missiles N83-10235
Balancing artificial reverberation for television stereophony
[BBC-RD-1982/9] N83-10310
Multiband envelope techniques for the removal of reverberation and noise from speech signals
[ISVR-TR-119] N83-10338

REVERSE OSMOSIS
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona
[PB82-177965] N83-10158

REYNOLDS NUMBER
Turbulence effects on high Reynolds number flow past circular cylinders
[PB82-176314] N83-10402

REYNOLDS STRESS
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82876] N83-10389

RHODIUM
Studies of chemical adsorption using low energy electron diffraction N83-10130

RICCATI EQUATION
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845

RIPPLES
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] N83-10940

RISK
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780

RIVER BASINS
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723

RIVERS
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
Vertical mixing and nutrient transport in the Chesapeake Bay
[PB82-178708] N83-10748

ROADS
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300

ROBOTS
Columbia's second mission. STS-2, the first flight of a used spacecraft
[NASA-TM-84865] N83-10104
General methods to enable robots with vision to acquire, orient and transport workpieces
[PB82-202540] N83-10788
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-VOL-4] N83-10849
A review of three-dimensional vision for robotics
[AD-A118055] N83-10850

ROBUSTNESS (MATHEMATICS)
Robust stability of Smith predictor controllers for time-delay systems
[RR-179] N83-10852

ROCK MECHANICS
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703

ROCKET LAUNCHERS
Optimal design of multiple tube grain and their arrangement
[AD-A117545] N83-10362

ROCKET LAUNCHING
Lateral dynamics of C4 missile N83-10268

ROCKS
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493
Geology of the Las Vegas area
[DE82-015871] N83-10692
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695

RODS
The connectivity of polymer networks by neutron scattering and a statistical theory of hard rod neumatic fluids
[PB82-208554] N83-10202
Global analysis of problems from nonlinear thermoelasticity N83-10437

ROOM TEMPERATURE
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171

ROSETTE SHAPES
Measuring plane states of stress with regular strain gauge rosettes
[CSIR-ME-1731] N83-10443

ROTARY WINGS
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
Holographic interferometry technique for rotary wing aerodynamics and noise
[NASA-TM-84723] N83-10378

ROTATING FLUIDS
The hydrodynamics of rotating superfluids N83-10384

ROTATION
Vacuum magnetic fields with dense flux surfaces
[DE82-014989] N83-10881

ROTOR AERODYNAMICS
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393

ROTOR BLADES (TURBOMACHINERY)
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393

ROTORS
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887

RUBY LASERS
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] N83-10908

RUNWAY CONDITIONS
Aircraft response to operations on rapidly repaired battle damaged runways and taxiways N83-10270

S

SAFETY DEVICES
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300
Passenger car occupant ejection
[PB82-202409] N83-10993

SAFETY MANAGEMENT
Reliability and safety of power systems --- mathematical models
[BMFT-FB-T-82-080] N83-10432

SALINITY
Intercomparison of primary and secondary standard seawater samples
[PB82-215716] N83-10741
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743

SALT BEDS
Water release and mechanical failure in heated geologic salt
[DE82-012054] N83-10476

SAMPLING
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
Water chemistry of the Illinois waterway
[PB82-181108] N83-10672
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974

SANDS
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650

SANDWICH STRUCTURES
Finite element analysis of viscoelastically damped sandwich structures N83-10225
Fabrication and development of several heat pipe honeycomb sandwich panel concepts --- airframe integrated scramjet engine
[NASA-CR-165962] N83-10379

SAPPHIRE
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416

SATELLITE ATTITUDE CONTROL
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101

SATELLITE DESIGN
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325

SATELLITE OBSERVATION
Post launch report on the heat capacity mapping mission
[NASA-TM-84859] N83-10095
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
Some closing thoughts: Practical payoffs from satellite systems N83-10468
Technology needs assessment of an atmospheric observation system for tropospheric research missions, part 1
[NASA-CR-3556] N83-10645
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2
[NASA-CR-3557] N83-10646
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2
[PB82-216581] N83-10730
Satellite observations of variations in Northern Hemisphere seasonal snow cover
[PB82-196668] N83-10734

SATELLITE TELEVISION
System for broadcasting television by satellite
[INPE-2468-PRE/157] N83-10327

SATELLITE TRACKING
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098

SATELLITE TRANSMISSION
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
Automatic Repeat Query (ARQ), Forward Error Corrector (FEC), and hybrid protection systems
[DM51/BR-JP/0596-82] N83-10339

SATURN RINGS
Other satellite atmospheres: Their nature and planetary interactions
[NASA-CR-169439] N83-11005

SCALE MODELS
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052

SCANNING
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967

SCATTERING CROSS SECTIONS
Electron bremsstrahlung angular-distribution fits for atomic numbers 1 or = to Z or = to 92 and incident-electron energies 1 kev or = to T or = to 500 keV
[DE82-013388] N83-10890

SCENE ANALYSIS
Familiarization with LANDSAT imagery N83-10460
Computer processed LANDSAT data N83-10463
Appendix C. LANDSAT: A worldwide perspective N83-10471

SCHOTTKY DIODES
The electrical properties of the anodic oxide/GaAs interface N83-10356

SCIENTISTS
Development of Egyptian instrumentation technology
[PB82-199845] N83-10411

SCINTILLATION COUNTERS
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889

SCRAP
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180

SCREW PINCH
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] N83-10919

SEA ICE
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736

SEA LEVEL
The sea level prediction model of the local AFOS MOS program
[PB82-215492] N83-10726

SEA STATES
The mean and variance of skywave radar sea-echo power spectra
[PB82-175969] N83-10744

SEA WATER
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649
Intercomparison of primary and secondary standard seawater samples
[PB82-215716] N83-10741

SEALERS
Synthesis of perfluorinated polyethers --- for sealers
[NASA-CR-166409] N83-10195
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306

SEASAT-A SATELLITE
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473

SEATS
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068

SEAWEEDS
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756

SEDIMENTS
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
Sampling and detection of tagged dredged material
[DE82-016056] N83-10650
Geology of the Southeastern Livermore Valley, Alameda County, California
[DE82-012496] N83-10697

SEISMIC ENERGY
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698

SEISMIC WAVES
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287
Seismic discrimination
[AD-A116884] N83-10686
Crustal and upper mantle velocity and Q of mainland China
[AD-A117030] N83-10687
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698
Fault zones and seismicity in western Connecticut and southeastern New York
[PB82-215641] N83-10710

SEISMOGRAMS
Inverse modeling system for analysis of seismic interfaces: INMOD
[BMFT-FB-T-82-063] N83-10704

SEISMOGRAPHS
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
Earthquake strong-motion instrumentation at Lawrence Livermore National Laboratory
[DE82-012493] N83-10700

SEISMOLOGY
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699

SELECTION
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809

SELECTIVE DISSEMINATION OF INFORMATION
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory
[PB82-184029] N83-10774

SELF CONSISTENT FIELDS
Self consistent loop antenna theory
[IPP-4/205] N83-10319

SEMICONDUCTOR DEVICES
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284

SEMICONDUCTORS (MATERIALS)
Flat-plate collector research area: Silicon material task N83-10519
Large-area silicon sheet task N83-10520
Investigation of new solar cells. Part A: Novel semiconductors and their suitability. Part B: Polycrystalline MIS diodes
[BMFT-FB-T-82-103] N83-10632
Low temperature photoluminescence studies of shallow electronic states in semiconductors N83-10959
Studies of growth-in defects and transport properties versus growth parameters in III-V compound semiconductors
[AD-A117871] N83-10966

SENSITIVITY
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] N83-10430
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845

SENSORIMOTOR PERFORMANCE
Maintaining motor skill performance
[AD-A117349] N83-10781

SENSORS
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098

SENSORY FEEDBACK
Feedback information and analysis for microprocessor controlled muscle stimulation
[AD-A115532] N83-10767

SEPARATION
Desulfurization of coal by means of the Batac-jig
[BMFT-FB-T-82-100] N83-10145
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209

SEPARATORS
Electrophoresis device
[NASA-CASE-MFS-25426-1] N83-10126
Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] N83-10135

SERVICE LIFE
Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] N83-10619

SERVOCONTROL
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991

SERVOMECHANISMS
The experimental performance of an on-off active damper N83-10227

SET THEORY
Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems
[DE82-007990] N83-10869

SETTLING
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091

SEWAGE
Sewage sludge as a supplementary utility boiler fuel N83-10590

SEWAGE TREATMENT
Sewage sludge as a supplementary utility boiler fuel N83-10590

SEWERS
Rain fall data for the design of sewer pipe systems
[PB82-187212] N83-10299
SHAFTS (MACHINE ELEMENTS)
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445
SHAKERS
Optimizing pre- and post-pulses for shaker shock testing N83-10232
Spacecraft modal testing using systematic multi-shakers sine-dwell testing techniques N83-10236
SHALE OIL
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140
Refining of military jet fuels from shale oil. Part 1. Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] N83-10210
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built
[BMFT-FB-T-82-085] N83-10623
SHAPES
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
SHEAR STRAIN
Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446
SHEARING
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
SHELLS (STRUCTURAL FORMS)
Finite element analysis of viscoelastically damped sandwich structures N83-10225
SHIP HULLS
Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244
SHIPS
An approach to the limitation and control of shipboard vibration N83-10217
A finite element model for failure initiation in shock loaded structural materials --- used in marine application N83-10252
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768
Health effects of low level radiation in shipyard workers
[DE82-001112] N83-10770
SHOCK ABSORBERS
Analysis of energy-absorbing shock mounts N83-10246
The response spectrum method of solution for displacement excitation N83-10250
SHOCK LOADS
A finite element model for failure initiation in shock loaded structural materials --- used in marine application N83-10252
Transient response analysis of a large radar antenna N83-10265
SHOCK RESISTANCE
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244
SHOCK SIMULATORS
EDESS: An electromagnetically-driven explosive-shock simulator --- generating explosive-like shocks in shipboard equipment N83-10245
SHOCK SPECTRA
An improved recursive formula for calculating shock response spectra N83-10251
SHOCK TESTS
Myths and sacred cows in shock and vibration N83-10221
The Shock and Vibration Bulletin. Part 2: Environmental testing, shock testing, shock analysis
[AD-D432830] N83-10231
Optimizing pre- and post-pulses for shaker shock testing N83-10232
Shock, vibration and fatigue in transportation industries N83-10233
Conservatism in least favorable response analysis and testing N83-10241
Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244
Analysis of energy-absorbing shock mounts N83-10246
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
A method for estimating the error induced by the Guyan Reduction N83-10256
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing
[PB82-213679] N83-10274
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane
[PB82-213687] N83-10281
SHOCK WAVE PROPAGATION
WONDY V: A one-dimensional finite-difference wave-propagation code
[DE82-019807] N83-10396
Notes on the unsteady rectilinear motion of a perfect gas. Part 5: A nonuniformly traveling shock wave in an LMS gas
[VTH-LR-328] N83-10398
SHOCK WAVES
High-resolution schemes for hyperbolic conservation laws
[NASA-CR-169381] N83-10856
SHOES
Testing of slipperiness: Forces applied to the floor and movements of the foot in walking and in slipping on the heel
[PB82-204108] N83-10787
SHORT TAKEOFF AIRCRAFT
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272
SIDELOBES
Ultralow sidelobe planar near field measurement study
[AD-A117744] N83-10331
SIDESLIP
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
SIGNAL ANALYSIS
Signal analysis and error analysis studies for a Geopotential Research Mission (GRM)
[NASA-TM-83970] N83-10674
Inverse modeling system for analysis of seismic interfaces: INMOD
[BMFT-FB-T-82-063] N83-10704
SIGNAL DETECTORS
Criteria for an optimum laser detector system for Thomson scattering experiments on fusion plasmas
[IPF-82-4] N83-10422
SIGNAL DISTORTION
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
SIGNAL FADING
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
SIGNAL GENERATORS
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
SIGNAL PROCESSING
Direct aircraft velocity determination by L-band moving target detector radar
[AD-A117512] N83-10031
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098
Low noise computationally efficient methods in digital signal processing N83-10318
Multiband envelope techniques for the removal of reverberation and noise from speech signals
[ISVR-TR-119] N83-10338
The Tricky-Fix signal processor N83-10347
Seismic discrimination
[AD-A116884] N83-10686
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215136] N83-10707
Studies of bistable optical devices
[AD-A117755] N83-10905
SIGNAL TO NOISE RATIOS
Analysis of possible interference in radio altimeters induced by a position marker system called RASP
[NLR-TR-81135-U] N83-10043
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337
SILANES
Thermal reactor --- liquid silicon production from silane gas
[NASA-CASE-NPO-14369-1] N83-10501
Union Carbide Corp. polysilicon status and plans N83-10508
SILICON
Laser annealing of ion implanted silicon N83-10418
Thermal reactor --- liquid silicon production from silane gas
[NASA-CASE-NPO-14369-1] N83-10501
FSAs future role N83-10507
Union Carbide Corp. polysilicon status and plans N83-10508
Advanced Czohcralski ingot growth N83-10509
PV history: Lessons for the future N83-10514
Large-area silicon sheet task N83-10520
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554
Carrier transport in amorphous silicon utilizing picosecond photoconductivity N83-10960
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962
SILICON CARBIDES
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967
SILICON COMPOUNDS
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127
SILICON CONTROLLED RECTIFIERS
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
A lightweight electronically commutated dc motor for electric passenger vehicles
[NASA-CR-165801] N83-10348
SILICON FILMS
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
SILVER
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
Improvements in heap leaching to recover silver and gold from low-grade resources
[PB82-193434] N83-10189
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
SILVER ZINC BATTERIES
Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] N83-10135
SIMULATION
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] N83-10615
SIMULATORS
Alternative electric generation impact simulator
[PB82-180324] N83-10302
Experimental investiation of neutral plasma beam propagation across a magnetic field
[AD-A117765] N83-10927
SINE WAVES
The Tricky-Fix signal processor N83-10347
SINGLE CRYSTALS
Modeling of thin film GaAs growth
[NASA-CR-169366] N83-10963

Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969

SINKHOLES
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490

SINTERING
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178
Improved speed control law for a sinter strand process
[RR-184] N83-10179

SITE SELECTION
Near surface observations N83-10464
Environmental Research Guiding Committee report
[PB82-220070] N83-10661

SIZE DISTRIBUTION
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134

SIZE SEPARATION
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation
[BMFT-FB-T-82-096] N83-10144

SKIDDING
Pavement roughness and skid properties
[PB82-212309] N83-10295

SKIN (ANATOMY)
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789

SKIN FRICTION
Turbulent boundary layer over solid and porous surfaces with small roughness
[NASA-CR-3612] N83-10383

SLAGS
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
High-temperature corrosion resistance of basic refractories to coal and lignite ash slags
[PB82-201351] N83-10186
Process development for economical processng of various vanadium bearing materials
[BMFT-FB-T-82-097] N83-10630

SLIDING FRICTION
Aggregate microtexture: Profile measurement and related frictional levels
[PB82-202565] N83-10124
Friction-type bolted connections with A588 weathering steel
[PB82-203183] N83-10292

SLIP CASTING
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543

SLOTS
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019

SLUDGE
Sewage sludge as a supplementary utility boiler fuel N83-10590
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662

SMELTING
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188

SNOW
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022
Satellite observations of variations in Northern Hemisphere seasonal snow cover
[PB82-196668] N83-10734
Depth perception with yellow goggles
[NSMRL-960] N83-10759

SODIUM
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003
Io: Escape and ionization of atmospheric gases
[NASA-CR-169443] N83-11004

SODIUM CHLORIDES
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968

SODIUM SULFUR BATTERIES
Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] N83-10614

SOFTWARE TOOLS
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
Software tools and more for Modcomp computers
[DE82-007985] N83-10823

SOIL MECHANICS
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287

SOIL MOISTURE
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472
Use of spectral data to estimate the relationship between soil moisture tensions and their corresponding reflectance
[PB82-224528] N83-10712

SOILS
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287

SOLAR ARRAYS
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
FSAs future role N83-10507
Block 5 module design summary N83-10510
Central-station applications: System and subsystem research activities N83-10511
Rooftop applications N83-10515
Flat-plate collector research area: Silicon material task N83-10519
Engineering sciences area and module performance and failure analysis area N83-10523
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607

SOLAR CELLS
Advanced Czohcralski ingot growth N83-10509
Photovoltaic research needs industry perspective N83-10516
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive N83-10517
Evaluation of advanced R and D topics in photovoltaics N83-10518
Cell and module formation research area N83-10522
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] N83-10555
The fabrication and evalution of a silicon photovoltaic cell with a directly nitrided tunnel insulator N83-10564
Methods for investigating the properties of polycrystalline silicon p-n junction solar cells N83-10565
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] N83-10597
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607
Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] N83-10620
Investigation of new solar cells. Part A: Novel semiconductors and their suitability. Part B: Polycrystalline MIS diodes
[BMFT-FB-T-82-103] N83-10632
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962

SOLAR COLLECTORS
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
An experimental investigation of convective losses from solar receivers
[UILU-ENG-81-4003] N83-10500
Flat-plate collector research area: Silicon material task N83-10519
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator N83-10526
Acurex Parabolic Dish Concentrator (PDC-2) N83-10527
The PKI collector N83-10528
Thin film concentrator panel development N83-10529
A transmittance-optimized, point-focus Fresnel lens solar concentrator N83-10530
The small community solar thermal power experiment N83-10531
Development status of the small community solar power system N83-10532
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas N83-10535
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543
Ceramic high temperature receiver design and tests N83-10544
Garrett solar Brayton engine/generator status N83-10545
Configuration selection study for isolated loads using parabolic dish modules N83-10548
An economic evaluation of solar energy N83-10549
Panel discussions: Industrial support sector requirements N83-10550
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] N83-10597
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015671] N83-10598
Designing the manifold piping for parabolic-trough-collector fields
[DE82-015998] N83-10599
Solar energy conversion based on the principe of fluorescent collectors
[BMFT-FB-T-82-081] N83-10621
Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] N83-10622
Tests with concentrating collectors --- construction, evaluation and qualification of parabolic solar absorbers
[BMFT-FB-T-82-104] N83-10626
The luminescent solar concentrator N83-10902

SOLAR ENERGY
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286
Application of the subatmospheric engine to solar thermal power N83-10546
Potential benefits from a successful solar thermal program N83-10547
Configuration selection study for isolated loads using parabolic dish modules N83-10548
An economic evaluation of solar energy N83-10549
Panel discussions: Industrial support sector requirements N83-10550
Solar thermal technologies benefits assessment: Objectives, methodologies and results for 1981
[NASA-CR-169373] N83-10551
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015671] N83-10598
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607
Intermediate photovoltaic system application experiment operational performance. Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] N83-10608

SOLAR ENERGY ABSORBERS
Tests with concentrating collectors --- construction, evaluation and qualification of parabolic solar absorbers
[BMFT-FB-T-82-104] N83-10626

SOLAR ENERGY CONVERSION
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Recent tests on the Carter small reciprocating steam engines N83-10536
The French thermo-helio-electricity-KW parabolic dish program N83-10542
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553

Solar energy conversion based on the principle of fluorescent collectors
[BMFT-FB-T-82-081] N83-10621
The luminescent solar concentrator N83-10902

SOLAR FLARES
Solar-Geophysical Data Number 450, supplement. Explanation of data reports
[PB82-200940] N83-11009

SOLAR FLUX
Plasma physics aspects of the solar neutrino problem N83-10912

SOLAR GENERATORS
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533

SOLAR HOUSES
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297

SOLAR NEUTRINOS
Plasma physics aspects of the solar neutrino problem N83-10912

SOLAR RADIATION
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber
[BMFT-FB-T-82-070] N83-10718

SOLAR RADIO EMISSION
Solar-geophysical data. Part 2: Comprehensive reports. Data for August 1981
[PB82-200932] N83-11008
Solar-Geophysical Data Number 450, supplement. Explanation of data reports
[PB82-200940] N83-11009

SOLAR REFLECTORS
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
Dish Stirling system integration and test progress report N83-10539
Commercialization of parabolic dish systems N83-10540
A point focusing collector for an integrated water/power complex N83-10541
The French thermo-helio-electricity-KW parabolic dish program N83-10542

SOLAR THERMAL ELECTRIC POWER PLANTS
An experimental investigation of convective losses from solar receivers
[UILU-ENG-81-4003] N83-10500
The small community solar thermal power experiment N83-10531
Development status of the small community solar power system N83-10532
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533

SOLAR TOTAL ENERGY SYSTEMS
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537

SOLAR WIND
Stationarity of magnetohydrodynamic fluctuations in the solar wind
[NASA-TM-83963] N83-11007

SOLAR X-RAYS
Solar-geophysical data. Part 2: Comprehensive reports. Data for August 1981
[PB82-200932] N83-11008

SOLID PROPELLANT ROCKET ENGINES
Meteorological assessment of SRM exhaust products' environmental impact
[NASA-CR-169453] N83-10648

SOLID SURFACES
Turbulent boundary layer over solid and porous surfaces with small roughness
[NASA-CR-3612] N83-10383

SOLID SUSPENSIONS
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation
[BMFT-FB-T-82-096] N83-10144

SOLID WASTES
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland N83-10581
Solid waste to methane gas (RefCOM) N83-10584
Urban waste as a potential source for brick plants N83-10591
Development of a solid waste fired fluidized boiler, phase 1 N83-10592
Conversion of municipal solid waste to energy, Jacksonville, Florida N83-10593
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596

SOLID-SOLID INTERFACES
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968

SOLIDS
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229

SOLUBILITY
National Seminar on Current Advances in the Technology of Oils and Allied Product
[PB82-218124] N83-10201

SOLUTES
Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] N83-10143

SOLUTIONS
The development and evaluation of hemoglobin solution as a blood substitute
[AD-A117318] N83-10764

SOLVENT REFINED COAL
Literature survey of properties of synfuels derived from coal
[NASA-TM-82739] N83-10208

SOLVENTS
Compilation of air pollutant emission factors, supplement 12
[PB82-184722] N83-10654

SONAR
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776

SOS (SEMICONDUCTORS)
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416

SOUND FIELDS
Balancing artificial reverberation for television stereophony
[BBC-RD-1982/9] N83-10310

SOUND INTENSITY
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886

SOUND TRANSMISSION
The Shock and Vibration Digest, volume 14, no. 8
[AD-A119004] N83-10433
A review of structural noise transmission N83-10434
Recent research on noise transmission into aircraft N83-10435

SOUND WAVES
Sound propagation through liquids in viscoelastic circular cylinders N83-10230

SPACE COMMUNICATION
End-to-end imaging information rate advantages of various alternative communication systems
[NASA-CR-169428] N83-10321

SPACE DEBRIS
Research in space commercialization, technology transfer, and communications
[NASA-CR-169447] N83-10972

SPACE HEATING (BUILDINGS)
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562
NECAP 4.1: NASA's Energy-Cost Analysis Program fast input manual and example
[NASA-TM-83241] N83-10566
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602
Feasibility study of geothermal heating, Modoc Lassen housing project
[DE82-015099] N83-10611
Geothermal community heating for Cape Charles, Virginia
[PB82-184003] N83-10640

SPACE MAINTENANCE
Manned geosynchronous mission requirements and systems analysis study add-on
[NASA-CR-167741] N83-10092

SPACE PERCEPTION
Depth perception with yellow goggles
[NSMRL-960] N83-10759

SPACE PROCESSING
Exothermic furnace module development — space processing
[NASA-TM-82500] N83-10093
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030
[NASA-TM-82497] N83-10094

SPACE PROGRAMS
Space research activities in Hungary, 1980 - 1981 N83-11014

SPACE SHUTTLE PAYLOADS
Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030
[NASA-TM-82497] N83-10094

SPACE SHUTTLES
STS-4 test mission simulates operational flight: President terms success golden spike in space
[NASA-TM-84866] N83-10103
Columbia's second mission. STS-2, the first flight of a used spacecraft
[NASA-TM-84865] N83-10104
STS-3, busiest and most successful test mission
[NASA-TM-84864] N83-10105
A free people capable of great deeds, the story of STS-1, the first Space Shuttle mission
[NASA-TM-84863] N83-10106
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424

SPACE SURVEILLANCE (SPACEBORNE)
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112

SPACE TRANSPORTATION SYSTEM 1 FLIGHT
A free people capable of great deeds, the story of STS-1, the first Space Shuttle mission
[NASA-TM-84863] N83-10106

SPACE TRANSPORTATION SYSTEM 2 FLIGHT
Columbia's second mission. STS-2, the first flight of a used spacecraft
[NASA-TM-84865] N83-10104

SPACE TRANSPORTATION SYSTEM 3 FLIGHT
STS-3, busiest and most successful test mission
[NASA-TM-84864] N83-10105

SPACE TRANSPORTATION SYSTEM 4 FLIGHT
STS-4 test mission simulates operational flight: President terms success golden spike in space
[NASA-TM-84866] N83-10103
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-828] N83-10107
Atmospheric environment for Space Shuttle (STS-4) launch
[NASA-TM-82498] N83-10108
Preliminary analysis of STS-4 entry flight data
[NASA-TM-81375] N83-10109

SPACEBORNE EXPERIMENTS
Exothermic furnace module development — space processing
[NASA-TM-82500] N83-10093
STS-4 test mission simulates operational flight: President terms success golden spike in space
[NASA-TM-84866] N83-10103

SPACECRAFT ANTENNAS
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-165979] N83-10110

SPACECRAFT COMMUNICATION
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325
Modulation techniques
[NASA-CR-169460] N83-10329

SPACECRAFT CONTROL
Preliminary analysis of STS-4 entry flight data
[NASA-TM-81375] N83-10109
Active Control of Space Structures (ACOSS) Eleven
[AD-A117596] N83-10111
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112

SPACECRAFT LAUNCHING
Mission operation report. RCA-E/Delta launch
[NASA-TM-84869] N83-10097
An informal discussion concerning geosynchronous communication satellites
[AD-A117546] N83-10099

SPACECRAFT PERFORMANCE
Spacecraft modal testing using systematic multi-shakers sine-dwell testing techniques N83-10236

SPACECRAFT RECOVERY
Manned geosynchronous mission requirements and systems analysis study add-on
[NASA-CR-167741] N83-10092
SPACECRAFT STABILITY
Passive stabilization of satellites by gravity gradient
[INPE-2462-PRE/154] N83-10096
Preliminary analysis of STS-4 entry flight data
[NASA-TM-81375] N83-10109
SPANLOADER AIRCRAFT
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
SPARK GAPS
Voltage breakdown of spark gaps in compressed gases
[AD-A117467] N83-10359
SPATIAL DISTRIBUTION
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
Some spectral and spatial characteristics of LANDSAT data N83-10461
SPATIAL RESOLUTION
High resolution, broad spectral band radiometer
[INPE-2460-TDL/096] N83-10405
SPECIFIC HEAT
The heat capacity of coal chars N83-10206
SPECIFIC IMPULSE
Pulsed inductive thruster development (Advanced electric propulsion technology: High thrust). Volume 2. Supplement
[AD-A117797] N83-10114
SPECIFICATIONS
Present status of flying qualities criteria for conventional aircraft --- military specifications transfer functions N83-10055
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211
A functional specification of the relational DBMS. I: Mandatory functions only
[PB82-182965] N83-10799
Theory of testing computer programs N83-10805
SPECTRA
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738
SPECTRAL EMISSION
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010541] N83-10363
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
SPECTRAL ENERGY DISTRIBUTION
Secondary standard stars for absolute spectrophotometry N83-11000
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001
SPECTRAL RECONNAISSANCE
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
SPECTRAL SIGNATURES
Some fundamental concepts in remote sensing N83-10459
Some spectral and spatial characteristics of LANDSAT data N83-10461
Near surface observations N83-10464
SPECTROPHOTOMETERS
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 2: User's guide
[PB82-187840] N83-10414
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415
SPECTRORADIOMETERS
High resolution, broad spectral band radiometer
[INPE-2460-TDL/096] N83-10405
SPECTROSCOPIC TELESCOPES
High resolution, broad spectral band radiometer
[INPE-2460-TDL/096] N83-10405
SPECTRUM ANALYSIS
Quick Look assessment and comparison of vibration specifications N83-10239
Use of spectral data to estimate the relationship between soil moisture tensions and their corresponding reflectance
[PB82-224528] N83-10712
Modification of Palmer drought index
[PB82-181751] N83-10731
Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer
[NASA-TM-83964] N83-10903
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
SPECULAR REFLECTION
Standard reference materials: Preparation and calibration of first surface aluminum mirror specular reflectance standards
[PB82-221367] N83-10909
SPEECH
Multiband envelope techniques for the removal of reverberation and noise from speech signals
[ISVR-TR-119] N83-10338
SPEED CONTROL
Improved speed control law for a sinter strand process
[RR-184] N83-10179
SPHERES
Investigation of concrete mixtures incorporating hollow plastic microspheres
[PB82-198193] N83-10125
SPHERICAL COORDINATES
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] N83-10928
SPHERICAL HARMONICS
The determination of geoidal waves using spherical harmonics
[INPE-2399-TDL/087] N83-10676
SPIN-LATTICE RELAXATION
Paramagnetic resonance studies of crystals N83-10965
SPINAL CORD
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments
[AD-A117464] N83-10765
SPINDLES
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
SPLINE FUNCTIONS
A rapidly recursive method for the B-splines N83-10015
Fitting multidimensional splines using statistical variable selection techniques
[NASA-CR-169363] N83-10867
SPRAYING
Field injection electrostatic spraying of liquid hydrogen N83-10215
SPREAD SPECTRUM TRANSMISSION
Direct sequence spread spectrum communications: Applications to multiple access and jamming resistance N83-10328
SPRINGS (ELASTIC)
The response spectrum method of solution for displacement excitation N83-10250
SPUTTERING
Ion sputter textured graphite --- anode collector plates in electron tube devices
[NASA-CASE-LEW-12919-1] N83-10117
Mechanical bonding of metal method
[NASA-CASE-LEW-12941-1] N83-10170
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951
SQUID PROJECT
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393
STABILITY
Production and experimental study of the dissipative trapped ion instability N83-10910
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] N83-10940
STABILITY DERIVATIVES
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051
STABILIZATION
Passive stabilization of satellites by gravity gradient
[INPE-2462-PRE/154] N83-10096
STABILIZED PLATFORMS
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
STANDARDIZATION
Standardization of map symbology
[AD-A117530] N83-10475
STANDARDS
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090
Standard reference materials: A standard reference material containing nominally fifteen percent austenite (SRM 486)
[PB82-215559] N83-10147
Review of the national ambient air quality standards for particulate matter: Assessment of scientific and technical information
[PB82-177874] N83-10670
Intercomparison of primary and secondary standard seawater samples
[PB82-215716] N83-10741
Validation summary report NCR Corporation V8570 VRX COBOL 30
[PB82-185554] N83-10798
A functional specification of the relational DBMS. I: Mandatory functions only
[PB82-182965] N83-10799
Standard reference materials: Preparation and calibration of first surface aluminum mirror specular reflectance standards
[PB82-221367] N83-10900
Secondary standard stars for absolute spectrophotometry N83-11000
STARK EFFECT
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916
STATIC LOADS
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689
STATISTICAL ANALYSIS
Statistical estimation of liquid propellent rocket engine parameters N83-10011
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311
Development of meteorological scenarios for air quality planning using multivariate statistical analysis of meteorological and air quality data N83-10644
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods
[DE82-013341] N83-10828
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] N83-10920
STATISTICAL DISTRIBUTIONS
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1
[PB82-202805] N83-10721
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods
[DE82-013341] N83-10828
Superposition of Markov renewal processes N83-10866
The theory of concentrated Fisher-von-Mises distributions
[AD-A117514] N83-10871
Large sample theory of the Fisher-von-Mises distribution
[AD-A117515] N83-10872
STATISTICAL MECHANICS
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
STATISTICAL TESTS
The theory of concentrated Fisher-von-Mises distributions
[AD-A117514] N83-10871

Large sample theory of the Fisher-von-Mises distribution
[AD-A117515] N83-10872

STATISTICAL WEATHER FORECASTING
A statistical dynamical model for prediction of tropical cyclone motion in the eastern north Pacific Ocean
[PB82-195298] N83-10732

STATORS
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013

STEADY STATE
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193

STEAM
Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] N83-10146
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] N83-10429
Recent tests on the Carter small reciprocating steam engines N83-10536
Small-scale waste-to-energy systems: A state-of-the-art report N83-10583

STEAM TURBINES
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887

STEEL STRUCTURES
Corrosion of architectural and structural metals and metal coatings in South Africa
[PB82-185869] N83-10181
The use of thermi sprayed coatings to combat atmospheric corrosion in the building and construction industry
[PB82-185836] N83-10182
Shaking table tests of a tubular steel frame model
[PB82-220161] N83-10277
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10278
Optimal design of seismic resistant planar steel frames
[PB82-220179] N83-10279
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300

STEELS
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
The removal of non-metallic inclusions from steel
[BLL-M26519] N83-10164
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180
The measurement of the cleavage fracture strength by means of an instrument impact test
[PB82-206806] N83-10183
Seminar on heat treatment and metallurgical quality control of forgings
[PB82-209438] N83-10184
Study of energy loss during a fracture event N83-10436

STELLAR EVOLUTION
The evolution of massive stars: The influence of initial composition and mass loss N83-11002

STELLAR LUMINOSITY
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001

STELLAR MASS EJECTION
The evolution of massive stars: The influence of initial composition and mass loss N83-11002
Solar-geophysical data. Part 2: Comprehensive reports. Data for August 1981
[PB82-200932] N83-11008

STELLAR SPECTRA
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997

STELLAR SPECTROPHOTOMETRY
Secondary standard stars for absolute spectrophotometry N83-11000
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001

STELLARATORS
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Tranaport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922

STEREOPHONICS
Balancing artificial reverberation for television stereophony
[BBC-RD-1982/9] N83-10310

STEREOSCOPIC VISION
A review of three-dimensional vision for robotics
[AD-A118055] N83-10850

STEREOSCOPY
A review of three-dimensional vision for robotics
[AD-A118055] N83-10850

STERILIZATION
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649

STIFFENING
Effect of stiffener arrangement on the random response of a flat panel N83-10260

STIFFNESS
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223

STIFFNESS MATRIX
Study of Guyan reduction of two degree of freedom systems N83-10255

STIMULATION
Feedback information and analysis for microprocessor controlled muscle stimulation
[AD-A115532] N83-10767

STIRLING CYCLE
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
Dish Stirling system integration and test progress report N83-10539
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] N83-10568
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991

STOCHASTIC PROCESSES
Correlation and moment properties relating numerical integration and stochastic integrals
[DE82-016088] N83-10855

STORAGE RINGS (PARTICLE ACCELERATORS)
Unconventional heating experiments in EBT
[DE82-013373] N83-10948
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956

STORAGE TANKS
High-efficiency commercial water heater development
[PB82-217514] N83-10290

STORMS (METEOROLOGY)
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723

STRAIN GAGE ACCELEROMETERS
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243

STRAIN GAGES
Measuring plane states of stress with regular strain gauge rosettes
[CSIR-ME-1731] N83-10443

STRATA
Improved roadheading by dinting behind the face line to full section
[BMFT-FB-T-82-087] N83-10478

STRATIGRAPHY
Geology of the Las Vegas area
[DE82-015871] N83-10692

STRATOSPHERE
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
Software system for reducing PAM-2 data
[NASA-CR-169458] N83-10684
The National Plan for Stratospheric Ozone Monitoring and Early Detection of Change, 1981 - 1986
[PB82-203159] N83-10706

STREAMS
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482

STRESS ANALYSIS
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445

STRESS CONCENTRATION
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame
[AD-A117470] N83-10427
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452
The stress distribution around an infinite row of circular holes in an orthotropic plate
[VTH-LR-340] N83-10453
A fracture mechanism map for pure iron
[PB82-189150] N83-10454
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703

STRESS CORROSION CRACKING
The effect of phase transformation on the fatigue crack growth rate of austenitic stainless steels tested in argon and hydrogen atmospheres N83-10166
The effect of water displacing corrosion preventives on stress corrosion cracking of aluminium alloy 7075-T651
[ARL-MAT-NOTE-132] N83-10173

STRESS INTENSITY FACTORS
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452

STRESS MEASUREMENT
Measuring plane states of stress with regular strain gauge rosettes
[CSIR-ME-1731] N83-10443

STRIP TRANSMISSION LINES
Design of 3 dB hybrid couplers using juxtaposed strip lines in homogeneous dielectrics
[INPE-2453-PRE/149] N83-10353

STROUHAL NUMBER
Jet response to pure tone excitation
[UTIAS-TN-232] N83-10381
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888

STRUCTURAL ANALYSIS
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
Quick Look assessment and comparison of vibration specifications N83-10239
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276
Investigation into methods of nondestructive evaluation of masonry structures
[PB82-218074] N83-10280
Mathematical programming in plastic analysis N83-10444
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program
[NASA-CR-167943] N83-10970

STRUCTURAL BASINS
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490

STRUCTURAL DESIGN
Acta Aeronautica et Astronautica Sinica
[AD-A117485] N83-10003
Optimal design of seismic resistant planar steel frames
[PB82-220179] N83-10279
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294
Seismic design guidelines for highway bridges
[PB82-181611] N83-10301
Optimization of composite structures
[NASA-TM-84544] N83-10447
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817

STRUCTURAL DESIGN CRITERIA
An example of longitudinal and transversal oscillation coupling: The Epsilon aircraft cork screw N83-10074
Seismic design guidelines for highway bridges
[PB82-181611] N83-10301

STRUCTURAL ENGINEERING
Feasibility study for the surface impulse loading of structures using mild detonating fuze N83-10248

STRUCTURAL FAILURE
A finite element model for failure initiation in shock loaded structural materials --- used in marine application N83-10252

Dynamic response of the progressively damaging structures N83-10267

STRUCTURAL MEMBERS

Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223

STRUCTURAL PROPERTIES (GEOLOGY)

Laboratory rock mechanics testing manual [DE82-015763] N83-10702

STRUCTURAL STABILITY

The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263

STRUCTURAL VIBRATION

An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254

Effect of a damper on the wind-induced oscillations of a tall mast [UTIAS-257] N83-10273

The Shock and Vibration Digest, volume 14, no. 8 [AD-A119004] N83-10433

A review of structural noise transmission N83-10434

Low-authority control synthesis for large space structures [NASA-CR-3495] N83-10441

STRUTS

Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264

SUBDWARF STARS

Secondary standard stars for absolute spectrophotometry N83-11000

SUBMARINES

Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242

A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243

A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244

EDESS: An electromagnetically-driven explosive-shock simulator — generating explosive-like shocks in shipboard equipment N83-10245

SUBMILLIMETER WAVES

Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer [NASA-TM-83964] N83-10903

SUBROUTINE LIBRARIES (COMPUTERS)

GRAF11: X-Y graph generation library [DE82-016320] N83-10813

SUBROUTINES

Airport landside. Volume 5. Appendix B. ALSIM subroutines [AD-A117603] N83-10087

An interactive computer program for the preliminary design and analysis of marine reduction gears [AD-A117828] N83-10808

Sparse linear programming subprogram [DE82-011783] N83-10826

User's manual for DISPAK, an easy approach to DISSPLA graphics [DE82-010902] N83-10829

SUBSONIC FLOW

Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts [NASA-TM-82876] N83-10389

SUBSONIC FLUTTER

Some measurements of wing buffeting on a flutter model of a typical strike aircraft [RAE-TR-82007] N83-10052

SUBSTITUTES

The development and evaluation of hemoglobin solution as a blood substitute [AD-A117318] N83-10764

SUBSTRATES

Method for depositing an oxide coating [NASA-CASE-LEW-13131-1] N83-10494

SULFATES

Sulfate resistance of mortars using fly ash as a partial replacement for Portland cement [PB82-208810] N83-10305

SULFIDES

Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides [PB82-177304] N83-10159

SULFONIC ACID

Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193

SULFUR

Low cost pavement marking materials based on plasticized sulfur [PB82-217969] N83-10289

Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003

SULFUR COMPOUNDS

Fossil-energy [DE82-018269] N83-10570

Ashing properties of coal blends N83-10572

SUNLIGHT

Sunlight induced movement of planktonic organisms and their relationships to water movements [PB82-211509] N83-10660

SUNRISE

The influence of the atmospheric ozone layer on the formation of layer D of the ionosphere at sunrise [INPE-2487-PRE/171] N83-10679

SUNSPOTS

Modification of Palmer drought index [PB82-181751] N83-10731

SUPERCONDUCTING MAGNETS

Stability and disturbance of large dc superconducting magnets [DE82-012388] N83-10879

Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] N83-10880

SUPERCONDUCTORS

Refrigeration system of superconducting generators for large power plants [BMFT-FB-T-82-071] N83-10369

SUPERCRITICAL WINGS

Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces [NASA-TM-84490] N83-10017

SUPERFLUIDITY

The hydrodynamics of rotating superfluids N83-10384

SUPERMASSIVE STARS

The evolution of massive stars: The influence of initial composition and mass loss N83-11002

SUPERSONIC AIRFOILS

Design of the leading edge of a delta wing [AD-A117469] N83-10036

SUPERSONIC COMBUSTION RAMJET ENGINES

Fabrication and development of several heat pipe honeycomb sandwich panel concepts — airframe integrated scramjet engine [NASA-CR-165962] N83-10379

SUPPORTS

SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test [PB82-208521] N83-10038

SUPPRESSORS

Utilizing numerical techniques in turbofan inlet acoustic suppressor design [NASA-TM-82994] N83-10885

SURFACE FINISHING

Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings [NASA-TM-82499] N83-10113

Measuring the microtopography of optical surfaces N83-11016

SURFACE LAYERS

A critical study of the role of the surface oxide layer in titanium bonding [NASA-CR-169457] N83-10174

SURFACE PROPERTIES

Mechanical bonding of metal method [NASA-CASE-LEW-12941-1] N83-10170

Surface analysis in composite bonding [NASA-CR-169456] N83-10196

SURFACE REACTIONS

Solar-assisted hydrogen generation by photoelectrocatalysis [PB82-227612] N83-10161

Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida [PB82-185141] N83-10490

SURFACE ROUGHNESS

Ion sputter textured graphite — anode collector plates in electron tube devices [NASA-CASE-LEW-12919-1] N83-10117

Aircraft response to operations on rapidly repaired battle damaged runways and taxiways N83-10270

Pavement roughness and skid properties [PB82-212309] N83-10295

Turbulent boundary layer over solid and porous surfaces with small roughness [NASA-CR-3612] N83-10383

A study of the structure of the wind over tropical savanna [INPE-2412-TDL/092] N83-10715

SURFACE VEHICLES

The Application of Traffic Simulation Models [PB82-207226] N83-10992

SURFACE WATER

Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin [PB82-202045] N83-10486

Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon [PB82-190356] N83-10491

SURFACE WAVES

Crustal and upper mantle velocity and Q of mainland China [AD-A117030] N83-10687

SURFACTANTS

Critical relationships for displacement processes in oil fields [BMFT-FB-T-82-093] N83-10479

SURVEYS

Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project [PB82-215815] N83-10742

SUSPENSION SYSTEMS (VEHICLES)

Pneumatic vibration control using active force generators N83-10226

SWEEP ANGLE

An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect [NASA-TP-2068] N83-10016

SWITCHING CIRCUITS

Telecommunication in power systems using optical fibre cells [BMFT-FB-T-82-082] N83-10336

SYMBOLS

Standardization of map symbology [AD-A117530] N83-10475

SYNCHRONISM

Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316

SYNCHRONOUS SATELLITES

Manned geosynchronous mission requirements and systems analysis study add-on [NASA-CR-167741] N83-10092

An informal discussion concerning geosynchronous communication satellites [AD-A117546] N83-10099

SYNCHROTRON RADIATION

Synchrotron radiation to be used to generate holographic X-ray gratings [DE82-008354] N83-10408

SYNCHROTRONS

A design study of the vacuum system of the Daresbury X-8 experimental line. Part 1: The front-end system [MTG-17] N83-10275

SYNOPTIC METEOROLOGY

Central San Joaquin Valley type maps [PB82-196064] N83-10733

SYNTHESIS (CHEMISTRY)

Investigation of large diameter polycrystalline crucible shaped inP [AD-A117739] N83-10137

Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980 [BLL-T5869/BG/MRS14614/82] N83-10495

Union Carbide Corp. polysilicon status and plans N83-10508

SYNTHETIC FUELS

Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208

SYSTEM IDENTIFICATION

Identification of multivariate linear systems [DE82-015201] N83-10873

SYSTEMS ANALYSIS

Equivalent systems criteria for handling qualities of military aircraft N83-10057

Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems [DE82-007990] N83-10869

Comparative performance evaluation of database management systems [DE82-010165] N83-10983

SYSTEMS ENGINEERING

Gain and phase margin as a basis of longitudinal flying qualities evaluation — fighter aircraft N83-10059

System for broadcasting television by satellite [INPE-2468-PRE/157] N83-10327

Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory [PB82-184029] N83-10774

Software Engineering, 7th Seminar [AD-A117995] N83-10811

SYSTEMS MANAGEMENT
Experiences in transportation system management [PB82-181322] N83-10303
SYSTEMS SIMULATION
The simulation study on a redundant flight control system N83-10014

T

TABLES (DATA)
Solar-geophysical data. Part 2: Comprehensive reports. Data for August 1981 [PB82-200932] N83-11008
TAKEOFF
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
TANTALUM OXIDES
The effect of Ta2O5 on the interaction between silicon and its contact metallization [NASA-TM-82948] N83-10554
TARGET RECOGNITION
Direct aircraft velocity determination by L-band moving target detector radar [AD-A117512] N83-10031
TASKS
Individual differences and time-sharing ability: A critical review and analysis [AD-A115082] N83-10778
Implications of dual-task performance variables for design of generic workstations: Literature review [AD-A114421] N83-10782
TECHNOLOGICAL FORECASTING
Report to the Congress for 1981 [PB82-202862] N83-10994
TECHNOLOGIES
Production technology of an electrolyte for Na/S batteries [BMFT-FB-T-82-065] N83-10614
TECHNOLOGY ASSESSMENT
Airport and air traffic control system [PB82-207606] N83-10033
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981 [PB82-197047] N83-10090
Aviation turbine fuels: An assessment of alternatives [NASA-CR-169395] N83-10214
State-of-the-art assessment of mobility measurements: A summary of European results N83-10218
Alternative electric generation impact simulator [PB82-180324] N83-10302
Remote sensing, a tool for managing the marine environment: Eight case studies [PB82-220864] N83-10483
Commercialization of parabolic dish systems N83-10540
Solar thermal technologies benefits assessment: Objectives, methodologies and results for 1981 [NASA-CR-169373] N83-10551
Geothermal energy development in the United States [PB82-215146] N83-10636
Technology needs assessment of an atmospheric observation system for tropospheric research missions, part 1 [NASA-CR-3556] N83-10645
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2 [NASA-CR-3557] N83-10646
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project [PB82-215815] N83-10742
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars [MASAD-81-20] N83-10875
Report to the Congress for 1981 [PB82-202862] N83-10994
TECHNOLOGY TRANSFER
The LANDSAT tutorial workbook: Basics of satellite remote sensing [E83-10001] N83-10458
Technology spin-offs from the magnetic fusion energy program [DE82-016923] N83-10897
Research in space commercialization, technology transfer, and communications [NASA-CR-169447] N83-10972
TECHNOLOGY UTILIZATION
A case study in the practical use of LANDSAT data N83-10466
Appendix C. LANDSAT: A worldwide perspective N83-10471
TECTONICS
Seismicity and active tectonics of the Andes and the origin of the Altiplano [NASA-CR-169362] N83-10675
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity [DE82-016957] N83-10690
TELECOMMUNICATION
Intercommunication between open networks [PB82-205188] N83-10843
TELEPHONES
Research in space commercialization, technology transfer, and communications [NASA-CR-169447] N83-10972
TELEVISION RECEIVERS
Comparability for UHF television [PB82-218710] N83-10344
TELEVISION RECEPTION
High quality decoding for PAL inputs to digital YUV studios [BBC-RD-1982/12] N83-10308
Comparability for UHF television [PB82-218710] N83-10344
TELEVISION SYSTEMS
System for broadcasting television by satellite [INPE-2468-PRE/157] N83-10327
TELEVISION TRANSMISSION
Balancing artificial reverberation for television stereophony [BBC-RD-1982/9] N83-10310
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons [NASA-TM-82970] N83-10322
Comparability for UHF television [PB82-218710] N83-10344
TEMPERATURE
Lower-curing-temperature PMR polyimides [NASA-TM-82958] N83-10118
An assessment of vapor compression heat pump technology and applications for industrial processes [PB82-227596] N83-10285
TEMPERATURE EFFECTS
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module [DE82-015671] N83-10598
TEMPERATURE GRADIENTS
A fracture mechanism map for pure iron [PB82-189150] N83-10454
TEMPERATURE MEASURING INSTRUMENTS
Evaluation of methods for rapid determination of freezing point of aviation fuels [NASA-CR-167981] N83-10207
TEMPERATURE PROBES
Development of advanced high-temperature heat flux sensors [NASA-CR-165618] N83-10044
TEMPERATURE PROFILES
Community heat-pump system, Klamath County, Oregon [DE82-015106] N83-10600
TEMPORAL DISTRIBUTION
Digital calculation of the propagation in time of the aircraft gust response covariance matrix [VTH-LR-266] N83-10053
TEMPORAL RESOLUTION
Familiarization with LANDSAT imagery N83-10460
Photointerpretation of LANDSAT images N83-10462
TENNESSEE VALLEY (AL-KY-TN)
Biomass fuels update. TVAs biomass fuels program [DE82-904990] N83-10613
TENSILE PROPERTIES
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses [DE82-012540] N83-10703
TENSILE STRESS
A fracture mechanism map for pure iron [PB82-189150] N83-10454
TERMINAL GUIDANCE
Techniques for air traffic planning and handling in the terminal area [DFVLR-MITT-82-04] N83-10032
TERMINOLOGY
NASA Thesaurus. Volume 1: Hierarchical listing [NASA-SP-7051-VOL-1] N83-10980
NASA Thesaurus. Volume 2: Access vocabulary [NASA-SP-7051-VOL-2] N83-10981
TERMS
Medical subject headings, Tree annotations, 1983 [PB82-208653] N83-10773
TERRAIN FOLLOWING AIRCRAFT
Operational criteria for the handling qualities of combat helicopters N83-10067
TEST CHAMBERS
Parameters for design of reverberant acoustic chambers for testing air-carried missiles N83-10235
TEST EQUIPMENT
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test [AD-A115052] N83-10769
TEST FACILITIES
Coal preparation and testing N83-10573
TEST VEHICLES
Random impact vibration testor N83-10234
TETHERLINES
Technical and economical assessment on Tethered Wind-Energy Systems (TWES) [DE82-017120] N83-10604
TEXTURES
Ion sputter textured graphite --- anode collector plates in electron tube devices [NASA-CASE-LEW-12919-1] N83-10117
Aggregate microtexture: Profile measurement and related frictional levels [PB82-202565] N83-10124
THEMATIC MAPPING
Photointerpretation of LANDSAT images N83-10462
Appendix A: The LANDSAT system N83-10469
THEOREMS
Large deviation local limit theorems for arbitrary sequences of random variables [AD-A117513] N83-10870
THERMAL BUCKLING
Magnetoelastic instabilities and vibrations of superconducting-magnet systems [DE82-015206] N83-10880
THERMAL CONTROL COATINGS
Further industrial tests of ceramic thermal barrier coatings [NASA-TP-2057] N83-10045
THERMAL ENERGY
Solar thermal technologies benefits assessment: Objectives, methodologies and results for 1981 [NASA-CR-169373] N83-10551
Investigation of heat storage for temperature range from 200 to 500 C [BMFT-FB-T-82-105] N83-10627
THERMAL MAPPING
Other remote sensing systems: Retrospect and outlook N83-10467
THERMAL POLLUTION
Coupled near and far field thermal plume analysis using finite element techniques [PB82-180316] N83-10667
THERMAL RESISTANCE
Edge attachment study for fire-resistant canopies [NASA-CR-166410] N83-10119
THERMAL STABILITY
Synthesis of perfluorinated polyethers --- for sealers [NASA-CR-166409] N83-10195
THERMAL STRESSES
Global analysis of problems from nonlinear thermoelasticity N83-10437
Environmental Research Guiding Committee report [PB82-220070] N83-10661
THERMIONIC CONVERTERS
External ionization mechanisms for advanced thermionic converters N83-10496
THERMOCHEMICAL PROPERTIES
Literature survey of properties of synfuels derived from coal [NASA-TM-82739] N83-10208
THERMOCOUPLES
Development of advanced high-temperature heat flux sensors [NASA-CR-165618] N83-10044
THERMODYNAMIC CYCLES
Air motion in a two stroke diesel engine cylinder N83-10423
THERMODYNAMIC PROPERTIES
Equation of state study for polar fluids [PB82-214388] N83-10157
The heat capacity of coal chars N83-10206
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methonol iso-butanol gasoline fuel blends [AD-A117746] N83-10426
Application of the subatmospheric engine to solar thermal power N83-10546
Laboratory rock mechanics testing manual [DE82-015763] N83-10702
THERMODYNAMICS
Application of the Hughes-LIU algorithm to the 2-dimensional heat equation [NASA-CR-3599] N83-10388
THERMOELASTICITY
Global analysis of problems from nonlinear thermoelasticity N83-10437

THERMONUCLEAR POWER GENERATION
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947

THERMONUCLEAR REACTIONS
Protection of large capacitor banks
[DE82-017353] N83-10366
Methods to enhance blanket power density
[DE82-017467] N83-10958

THESAURI
Medical subject headings, Tree annotations, 1983
[PB82-208653] N83-10773
NASA Thesaurus. Volume 1: Hierarchical listing
[NASA-SP-7051-VOL-1] N83-10980
NASA Thesaurus. Volume 2: Access vocabulary
[NASA-SP-7051-VOL-2] N83-10981

THICKNESS
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008
Further industrial tests of ceramic thermal barrier coatings
[NASA-TP-2057] N83-10045

THIN FILMS
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
Thin film concentrator panel development N83-10529
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567
Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] N83-10620
Modeling of thin film GaAs growth
[NASA-CR-169366] N83-10963

THOMAS-FERMI MODEL
Numerical calculation of the Thomas-Fermi-von Weizsacker function for an infinite atom without electron repulsion
[DE82-014123] N83-10893

THOMSON SCATTERING
Criteria for an optimum laser detector system for Thomson scattering experiments on fusion plasmas
[IPF-82-4] N83-10422
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] N83-10908

THREE DIMENSIONAL BOUNDARY LAYER
The numerical computation of three-dimensional turbulent boundary layers
[RAE-TM-AERO-1945] N83-10390

THREE DIMENSIONAL FLOW
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403

THREE DIMENSIONAL MOTION
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257

THUNDERSTORMS
Surface meteorological features associated with eastern Colorado severe convective storms
[PB82-203134] N83-10722

TIDAL FLATS
The ecology of Southern California coastal salt marshes: A community profile
[PB82-205717] N83-10655
The ecology of New England high salt marshes: A community profile
[PB82-217118] N83-10658
The ecology of New England tidal flats: A community profile
[PB82-217100] N83-10659

TIME CONSTANT
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253

TIME DEPENDENCE
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193

TIME DIVISION MULTIPLE ACCESS
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325

TIME LAG
Effect of control system delays on fighter flying qualities N83-10072
Effect of control system delays on fighter flying qualities N83-10073
Robust stability of Smith predictor controllers for time-delay systems
[RR-179] N83-10852

TIME MEASUREMENT
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258

TIME OF FLIGHT SPECTROMETERS
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409

TIME SERIES ANALYSIS
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562

TIME SHARING
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
Time-sharing comparisons of several computers
[DE82-014514] N83-10841

TIN COMPOUNDS
Role of tin catalysts in the hydroliquefaction of coal --- hydrocracking N83-10131

TIROS N SERIES SATELLITES
TIROS-N series direct readout services users guide
[PB82-219023] N83-10728

TITANIUM
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172
A critical study of the role of the surface oxide layer in titanium bonding
[NASA-CR-169457] N83-10174

TITANIUM OXIDES
Properties of Pt supported on oxides of titanium
[AD-A117892] N83-10139

TITRATION
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757

TOKAMAK DEVICES
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] N83-10919
US-Japan Workshop on Burning Plasma Physics and Engineering
[IPPJ-599] N83-10921
Measurements of magnetic field fluctuations in the Caltech research Tokamak N83-10925
Measurements of fusion reactions from a Tokamak plasma --- plasma diagnostics N83-10926
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932
Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] N83-10933
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] N83-10934
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] N83-10940
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942
Fusion reactor plasma-performance modeling: POPCON analysis
[DE82-016364] N83-10943
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] N83-10949
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953
Charge-capture experiments for plasma ions and neutral atoms
[DE82-014502] N83-10954
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957

TOMOGRAPHY
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691

TOPOLOGY
The connectivity of polymer networks by neutron scattering and a statistical theory of hard rod neumatic fluids
[PB82-208554] N83-10202

TOROIDAL PLASMAS
Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] N83-10934

TORQUEMETERS
Evaluation of new Iroquois torquemeter PN 73-30-1
[AD-A117747] N83-10042

TORSIONAL STRESS
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445

TORSIONAL VIBRATION
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254

TOWERS
Effect of a damper on the wind-induced oscillations of a tall mast
[UTIAS-257] N83-10273
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602

TOXIC HAZARDS
The transportation of hazardous materials
[RV/1/81] N83-10990

TOXICITY
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140

TRACE CONTAMINANTS
Microstructure of coal N83-10576

TRACE ELEMENTS
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709

TRADEOFFS
Some closing thoughts: Practical payoffs from satellite systems N83-10468

TRAFFIC CONTROL
The Application of Traffic Simulation Models
[PB82-207226] N83-10992

TRAINING AIRCRAFT
An example of longitudinal and transversal oscillation coupling: The Epsilon aircraft cork screw N83-10074

TRAINING ANALYSIS
Maintaining motor skill performance
[AD-A117349] N83-10781

TRAINING DEVICES
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766

TRAJECTORIES
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409

TRANSFER FUNCTIONS
Comparative system model validation using four optimization algorithms
[NIAST-81/124] N83-10877

TRANSFORMATIONS (MATHEMATICS)
Notes on the unsteady rectilinear motion of a perfect gas. Part 6: On a transformation of Staniukovich and its generalization
[VTH-LR-329] N83-10399
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874
Vacuum magnetic fields with dense flux surfaces
[DE82-014989] N83-10881

TRANSIENT LOADS
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262

TRANSIENT RESPONSE
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
Transient response analysis of a large radar antenna N83-10265
Application of the Hughes-LIU algorithm to the 2-dimensional heat equation
[NASA-CR-3599] N83-10388
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562
TRANSISTORS
RF characterization of semiconductors
[DE82-016995] N83-10335
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] N83-10349
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
CS1: A two-dimensional finite element charge-sheet model of a short-channel MOS transistor
[PB82-205709] N83-10376
TRANSITION POINTS
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
TRANSMISSION
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
TRANSMISSION EFFICIENCY
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322
Automatic Repeat Query (ARQ), Forward Error Corrector (FEC), and hybrid protection systems
[DM51/BR-JP/0598-82] N83-10339
TRANSMISSION LINES
A fibre-optic link for television outside broadcasts
[BBC-RD-1982/11] N83-10312
The horizontal wire over Earth as a transmission line: A model surface-impedance approach
[AD-A117993] N83-10334
TRANSMISSIONS (MACHINE ELEMENTS)
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
TRANSMITTANCE
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds
[DE82-015855] N83-10116
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177961] N83-10416
TRANSONIC FLOW
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
TRANSONIC WIND TUNNELS
Sensitivity analysis of cool-down strategies for a transonic cryogenic tunnel
[NASA-TM-84527] N83-10082
TRANSPORT AIRCRAFT
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024
Handling qualities of transports with advanced flight control systems N83-10081
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076
TRANSPORT PROPERTIES
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889
TRANSPORT THEORY
Vertical mixing and nutrient transport in the Chesapeake Bay
[PB82-178708] N83-10748
TRANSPORTATION
Shock, vibration and fatigue in transportation industries N83-10233
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271
The transportation of hazardous materials
[RV/1/81] N83-10990
TRAPPED PARTICLES
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346
Production and experimental study of the dissipative trapped ion instability N83-10910
TRAVELING WAVES
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
TREATMENT
Conditioning of matrices arising in the solution of stiff ODEs
[DE82-017641] N83-10878
TREES (PLANTS)
Tannin adhesives: From laboratory to industry
[PB82-206814] N83-10203
TRINITROTOLUENE
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209
TROPICAL REGIONS
A study of the structure of the wind over tropical savanna
[INPE-2412-TDL/092] N83-10715
TROPICAL STORMS
A statistical dynamical model for prediction of tropical cyclone motion in the eastern north Pacific Ocean
[PB82-195298] N83-10732
TROPOPAUSE
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040
TROPOSPHERE
Technology needs assessment of an atmospheric observation system for tropospheric research missions, part 1
[NASA-CR-3556] N83-10645
A study of the anomalous thermal and wind patterns during early summer season of 1979 over the Afro-Asian region in relation to the large scale performance of the monsoon over India
[PB82-204611] N83-10724
TRUSSES
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442
TUNGUSK METEORITE
Anomalous twilights related to the Tungussk Meteorite
[NASA-TM-76707] N83-11006
TURBINE BLADES
On nonlinear response of multiple blade systems N83-10261
Investigations of the tornado wind energy system
[DE82-017122] N83-10601
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program
[NASA-CR-167943] N83-10970
TURBINE ENGINES
Aviation turbine fuels: An assessment of alternatives
[NASA-CR-169395] N83-10214
TURBINES
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
TURBOCOMPRESSORS
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393
TURBOFAN ENGINES
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
Utilizing numerical techniques in turbofan inlet acoustic suppressor design
[NASA-TM-82994] N83-10885
TURBOGENERATORS
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537
TURBOPROP AIRCRAFT
Vibration qualification of equipment mounted in turboprop aircraft N83-10238
TURBULENCE
Jet response to pure tone excitation
[UTIAS-TN-232] N83-10381
TURBULENCE EFFECTS
Turbulence effects on high Reynolds number flow past circular cylinders
[PB82-176314] N83-10402
TURBULENT BOUNDARY LAYER
Turbulent boundary layer over solid and porous surfaces with small roughness
[NASA-CR-3612] N83-10383
The numerical computation of three-dimensional turbulent boundary layers
[RAE-TM-AERO-1945] N83-10390
TURBULENT FLOW
Turbulent transport modelling of separating and reattaching shear flows
[NASA-CR-169368] N83-10380
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82878] N83-10389
New higher-order boundary-layer equations for laminar and turbulent flow past axisymmetric bodies
[AD-A117806] N83-10392
TURBULENT JETS
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403
TURBULENT MIXING
Turbulent transport modelling of separating and reattaching shear flows
[NASA-CR-169368] N83-10380
TWENTY-FOUR HOUR ORBITS
An informal discussion concerning geosynchronous communication satellites
[AD-A117546] N83-10099
TWILIGHT GLOW
Anomalous twilights related to the Tungusk Meteorite
[NASA-TM-76707] N83-11006
TWO DIMENSIONAL BOUNDARY LAYER
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10857
TWO DIMENSIONAL FLOW
Turbulent transport modelling of separating and reattaching shear flows
[NASA-CR-169368] N83-10380
TWO PHASE FLOW
Unsteady 2-phase flow instrumentation and measurement N83-10406
TYPHOONS
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717

U

UH-1 HELICOPTER
Evaluation of new Iroquois torquemeter PN 73-30-1
[AD-A117747] N83-10042
ULTRAHIGH FREQUENCIES
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322
Comparability for UHF television
[PB82-218710] N83-10344
ULTRASONIC RADIATION
High-frequency ultrasonics: Non-destructive analysis of material structures
[BLL-RISLEY-TR-4166F-(9091.9F)] N83-10431
ULTRASONIC SPECTROSCOPY
Ultrasound spectroscopy N83-10884
ULTRASONICS
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882
ULTRAVIOLET RADIATION
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204
Sunlight induced movement of planktonic organisms and their relationships to water movements
[PB82-211509] N83-10660
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789
ULTRAVIOLET SPECTRA
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997
The peculiar extinction of Herschel 36
[NASA-TM-84893] N83-10998
UNDERGROUND EXPLOSIONS
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688
UNDERGROUND STORAGE
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
UNDERGROUND STRUCTURES
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287
Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] N83-10503
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
UNDERWATER EXPLOSIONS
Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242

Study of the propagation of waves generated by underwater explosions
[INPE-2391-TDL/086] N83-10382

UNSTEADY FLOW
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393
Notes on the unsteady rectilinear motion of a perfect gas. Part 5: A nonuniformly traveling shock wave in an LMS gas
[VTH-LR-328] N83-10396
Notes on the unsteady rectilinear motion of a perfect gas. Part 6: On a transformation of Staniukovich and its generalization
[VTH-LR-329] N83-10399
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
Unsteady 2-phase flow instrumentation and measurement N83-10406

UPLINKING
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325

UPPER ATMOSPHERE
Technical and economical assessment on Tethered Wind-Energy Systems (TWES)
[DE82-017120] N83-10604
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2
[NASA-CR-3557] N83-10646

URBAN PLANNING
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop: Converting Waste to Energy
[DE82-014337] N83-10578

URBAN TRANSPORTATION
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] N83-10349

USER MANUALS (COMPUTER PROGRAMS)
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide
[AD-A117600] N83-10084
Augmentor stability management program user's manual
[AD-A117749] N83-10138
AGS-880 menu system user guide
[DE82-019955] N83-10793
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10808
ODD user manual: The other data display
[DE82-013750] N83-10812
SLAVE: A package of enhancements for the VAX/VMS EDT text editor
[DE82-019827] N83-10814
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide)
[DE82-017351] N83-10825
User's manual for DISPAK, an easy approach to DISSPLA graphics
[DE82-010902] N83-10829

USER REQUIREMENTS
Interactive language characteristics for a data dictionary system
[PB82-203696] N83-10837

UTILITIES
Potential benefits from a successful solar thermal program N83-10547

V

V/STOL AIRCRAFT
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403

VACUUM APPARATUS
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346

VACUUM EFFECTS
A design study of the vacuum system of the Daresbury X-8 experimental line. Part 1: The front-end system
[MTG-17] N83-10275

VACUUM PUMPS
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346

VALENCE
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141

VALUE ENGINEERING
Flight testing operations procedure
[AD-A116984] N83-10030

VANADIUM
Process development for economical processng of various vanadium bearing materials
[BMFT-FB-T-82-097] N83-10630

VANES
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program
[NASA-CR-167943] N83-10970

VAPOR DEPOSITION
Flat-plate collector research area: Silicon material task N83-10519

VAPOR PHASES
Equation of state study for polar fluids
[PB82-214388] N83-10157
Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] N83-10429

VAPOR PRESSURE
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417

VARIATIONS
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008

VEHICLES
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665

VELOCITY
Program to predict performance of a gas gun
[DE82-007644] N83-10088

VELOCITY DISTRIBUTION
Optimizing pre- and post-pulses for shaker shock testing N83-10232

VELOCITY MEASUREMENT
Direct aircraft velocity determination by L-band moving target detector radar
[AD-A117512] N83-10031
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735

VERTEBRAE
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments
[AD-A117464] N83-10765

VERTICAL ORIENTATION
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information
[AD-A116819] N83-10685

VIBRATION
The Shock and Vibration Bulletin. Part 1: Keynote address, invited papers, damping and isolation, fluid-structure interaction
[AD-D432836] N83-10216
An approach to the limitation and control of shipboard vibration N83-10217
State-of-the-art assessment of mobility measurements: A summary of European results N83-10218
Department of Defense policy on reliability and maintainability N83-10219
Necessary and sufficient qualification for shock N83-10220
Myths and sacred cows in shock and vibration N83-10221
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223
Finite element analysis of viscoelastically damped sandwich structures N83-10225
Pneumatic vibration control using active force generators N83-10226
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786

VIBRATION DAMPING
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-165979] N83-10110
The Shock and Vibration Bulletin. Part 1: Keynote address, invited papers, damping and isolation, fluid-structure interaction
[AD-D432836] N83-10216
An approach to the limitation and control of shipboard vibration N83-10217
On modeling viscoelastic behavior N83-10222
Effect of stiffener arrangement on the random response of a flat panel N83-10260
Effect of a damper on the wind-induced oscillations of a tall mast
[UTIAS-257] N83-10273

VIBRATION EFFECTS
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
Evaluation Report: The Specialists' Meeting on Dynamic Environmental Qualification Techniques
[AGARD-AR-183] N83-10039
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271

VIBRATION ISOLATORS
The experimental performance of an on-off active damper N83-10227
The response spectrum method of solution for displacement excitation N83-10250
An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254
Low-authority control synthesis for large space structures
[NASA-CR-3495] N83-10441

VIBRATION MEASUREMENT
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243

VIBRATION SIMULATORS
Optimizing pre- and post-pulses for shaker shock testing N83-10232
Spacecraft modal testing using systematic multi-shakers sine-dwell testing techniques N83-10236

VIBRATION TESTS
Myths and sacred cows in shock and vibration N83-10221
The Shock and Vibration Bulletin. Part 2: Environmental testing, shock testing, shock analysis
[AD-D432830] N83-10231
Shock, vibration and fatigue in transportation industries N83-10233
Random impact vibration testor N83-10234
Vibration qualification of equipment mounted in turboprop aircraft N83-10238
Quick Look assessment and comparison of vibration specifications N83-10239
Vibration test level criteria for aircraft equipment N83-10240
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
A method for estimating the error induced by the Guyan Reduction N83-10256
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262

VIBRATIONAL SPECTRA
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892

VIDEO COMMUNICATION
A fibre-optic link for television outside broadcasts
[BBC-RD-1982/11] N83-10312

VIDEO DATA
A modified adaptive delta modulator for video data compression N83-10317

VISCOELASTICITY
On modeling viscoelastic behavior N83-10222

Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223
Finite element analysis of viscoelastically damped sandwich structures N83-10225
Sound propagation through liquids in viscoelastic circular cylinders N83-10230

VISCOMETERS
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020

VISCOUS FLOW
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82876] N83-10389

VISUAL ACUITY
Recommendations for color vision testing and criteria for its implementation at Sandia National Laboratories
[DE82-019826] N83-10772

VOLATILITY
Fugitive emission sources of organic compounds: Additional information on emissions, emission reductions, and costs
[PB82-217126] N83-10657

VOLCANOES
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado
[PB82-215070] N83-10711

VOLCANOLOGY
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680

VORTICES
The hydrodynamics of rotating superfluids N83-10384

VORTICITY
The sea level prediction model of the local AFOS MOS program
[PB82-215492] N83-10726

VULNERABILITY
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249

W

WALKING
Testing of slipperiness: Forces applied to the floor and movements of the foot in walking and in slipping on the heel
[PB82-204108] N83-10787

WALLS
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane
[PB82-213687] N83-10281
Demonstration Tokamak power plant study
[DE82-016182] N83-10937
Methods to enhance blanket power density
[DE82-017467] N83-10958

WAR GAMES
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766

WARFARE
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786

WARNING SYSTEMS
Automatic audio signing. Volume 1: Executive summary
[PB82-202953] N83-10282
Automatic audio signing. Volume 2: Review, analysis and design
[PB82-202961] N83-10283

WASTE DISPOSAL
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 N83-10588
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
Ocean dumping monitoring and research, January through December 1979
[PB82-176231] N83-10671
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691

WASTE ENERGY UTILIZATION
Positive displacement rotary vapor compressor for vapor compression --- for waste steam utilization
[PB82-227620] N83-10429
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop: Converting Waste to Energy
[DE82-014337] N83-10578
A laboratory approach to obtain suspension combustion data for reuse derived fuels N83-10579
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland N83-10581
Characterization of RDF properties through high pressure differential scanning calorimetry N83-10582
Small-scale waste-to-energy systems: A state-of-the-art report N83-10583
Solid waste to methane gas (RefCOM) N83-10584
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
Sewage sludge as a supplementary utility boiler fuel N83-10590

WASTE TREATMENT
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland N83-10581
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 N83-10588
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662

WASTE UTILIZATION
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 N83-10588
Urban waste as a potential source for brick plants N83-10591
Development of a solid waste fired fluidized boiler, phase 1 N83-10592
Conversion of municipal solid waste to energy, Jacksonville, Florida N83-10593
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
Landfill gas recovery: An analysis of results N83-10596

WASTE WATER
ANFLOW: Characterization and development of an energy conserving wastewater treatment system N83-10585
Water hyacinth wastewater treatment system N83-10586
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2
[BMFT-FB-T-82-108] N83-10652
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662

WATER
Water release and mechanical failure in heated geologic salt
[DE82-012054] N83-10476
Water chemistry of the Illinois waterway
[PB82-181108] N83-10672

WATER CIRCULATION
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489

WATER CONSUMPTION
Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] N83-10498

WATER DEPTH
Study of the propagation of waves generated by underwater explosions
[INPE-2391-TDL/086] N83-10382

WATER FLOW
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488

WATER HEATING
High-efficiency commercial water heater development
[PB82-217514] N83-10290
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602
Running hot water: A systems approach to energy conservation
[FOA-C-10202-M2] N83-10628

WATER MANAGEMENT
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488
Groundwater management: Discussion of issues. Report of the Interstate Groundwater Task Force prepared by the US Water Resources Council
[PB82-181637] N83-10666

WATER POLLUTION
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662
Ocean pollution research, development and monitoring
[PB82-219049] N83-10740

WATER QUALITY
A case study in the practical use of LANDSAT data N83-10466
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon
[PB82-190356] N83-10491
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project
[PB82-215815] N83-10742

WATER RESOURCES
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon
[PB82-190356] N83-10491
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649
Groundwater management: Discussion of issues. Report of the Interstate Groundwater Task Force prepared by the US Water Resources Council
[PB82-181637] N83-10666

WATER RUNOFF
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720

WATER TREATMENT
ANFLOW: Characterization and development of an energy conserving wastewater treatment system N83-10585
Water hyacinth wastewater treatment system N83-10586
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2
[BMFT-FB-T-82-108] N83-10652
First full-scale flotation plant in the USA for portable water treatment
[PB82-220690] N83-10653
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662

WATER VAPOR
Variability of water vapor flux in the northeast Brazil region
[INPE-2461-PRE/153] N83-10716

WATERPROOFING
The effect of water displacing corrosion preventives on stress corrosion cracking of aluminium alloy 7075-T651
[ARL-MAT-NOTE-132] N83-10173
WAVE EQUATIONS
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10657
WAVE INTERACTION
Phase conjugate optics and its potential applications
[AD-A117468] N83-10906
WAVE PROPAGATION
Sound propagation through liquids in viscoelastic circular cylinders N83-10230
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287
Study of the propagation of waves generated by underwater explosions
[INPE-2391-TDL/086] N83-10382
Some fundamental concepts in remote sensing N83-10459
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936
WAVE SCATTERING
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150
Ray methods for inverse problems of elastic wave scattering N83-10315
High-frequency ultrasonics: Non-destructive analysis of material structures
[BLL-RISLEY-TR-4166F-(9091.9F)] N83-10431
On scattering and everywhere defined scattering operators for nonlinear Klein-Gordon equations
[CTH-MATH-1982-09] N83-10859
WAVEGUIDES
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953
WAXES
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306
WEAPON SYSTEMS
Operational criteria for the handling qualities of combat helicopters N83-10067
Feasibility study for the surface impulse loading of structures using mild detonating fuze N83-10248
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249
RF characterization of semiconductors
[DE82-016995] N83-10335
WEAR
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194
WEATHER
Weather constraints on airborne laser hydrography operations
[PB82-189754] N83-10745
WEATHER FORECASTING
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
Surface meteorological features associated with eastern Colorado severe convective storms
[PB82-203134] N83-10722
Central San Joaquin Valley type maps
[PB82-196064] N83-10733
WEATHER MODIFICATION
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1
[PB82-202805] N83-10721
WEATHERPROOFING
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973
WEBS (SUPPORTS)
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing
[PB82-213679] N83-10274
WEIGHT (MASS)
Program to predict performance of a gas gun
[DE82-007644] N83-10088
WEIGHTLESSNESS
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-828] N83-10107
WELDING
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] N83-10555
Health effects of welding fumes and gases
[DE82-012199] N83-10771
WELLS
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151
WETLANDS
State and local acquisition of floodplains and wetlands: A handbook on the use of acquisition in floodplain management
[PB82-284805] N83-10664
WHITE NOISE
The Tricky-Fix signal processor N83-10347
WIND (METEOROLOGY)
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
A study of the structure of the wind over tropical savanna
[INPE-2412-TDL/092] N83-10715
A study of the anomalous thermal and wind patterns during early summer season of 1979 over the Afro-Asian region in relation to the large scale performance of the monsoon over India
[PB82-204611] N83-10724
WIND DIRECTION
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
WIND EFFECTS
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
Effect of a damper on the wind-induced oscillations of a tall mast
[UTIAS-257] N83-10273
WIND MEASUREMENT
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024
WIND PROFILES
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
A study of the structure of the wind over tropical savanna
[INPE-2412-TDL/092] N83-10715
WIND SHEAR
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040
WIND TUNNEL MODELS
Investigations of the tornado wind energy system
[DE82-017122] N83-10601
WIND TUNNEL TESTS
Aerodynamic characteristics of maneuvering flaps N83-10004
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052
Analysis of subcritical response measurements from aircraft flutter tests N83-10269
Turbulence effects on high Reynolds number flow past circular cylinders
[PB82-176314] N83-10402
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] N83-10624
WIND TURBINES
Aeroelastic stability analysis of a Darrieus wind turbine
[DE82-017001] N83-10603
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] N83-10624
WIND VELOCITY
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
Wind power potential in Belgium
[PUBL-SER-B-115] N83-10563
WIND VELOCITY MEASUREMENT
Simple anemometer for wind classification
[BMFT-FB-T-82-106] N83-10719
WINDMILLS (WINDPOWERED MACHINES)
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602
Measurement studies of a 15 kW wind power plant — data acquisition and economic evaluation of a 15 kW windmill
[BMFT-FB-T-82-109] N83-10633
WINDPOWER UTILIZATION
Wind power potential in Belgium
[PUBL-SER-B-115] N83-10563
Investigations of the tornado wind energy system
[DE82-017122] N83-10601
Technical and economical assesament on Tethered Wind-Energy Systems (TWES)
[DE82-017120] N83-10604
WINDPOWERED GENERATORS
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] N83-10624
Measurement studies of a 15 kW wind power plant — data acquisition and economic evaluation of a 15 kW windmill
[BMFT-FB-T-82-109] N83-10633
WING FLAPS
Aerodynamic characteristics of maneuvering flaps N83-10004
WING FLOW METHOD TESTS
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052
WING LOADING
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034
WING NACELLE CONFIGURATIONS
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272
WING PLANFORMS
Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces
[NASA-TM-84490] N83-10017
WING PROFILES
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
WINGLETS
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034
WINGS
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
WOOD
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
WORD PROCESSING
Word processing/office information systems: Managers perspective, a management tool
[DE82-016000] N83-10984
WORKLOADS (PSYCHOPHYSIOLOGY)
Individual differences and time-sharing ability: A critical review and analysis
[AD-A115082] N83-10778

X

X RAY APPARATUS
The metal-ceramic X-ray tube
[DRIC-T-6676] N83-10357
X RAY DIFFRACTION
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571
X RAY SPECTRA
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942

X RAYS
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
X-Y PLOTTERS
GRAF11: X-Y graph generation library
[DE82-016320] N83-10813
XENON LAMPS
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010641] N83-10363

Y

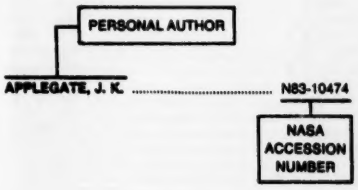
YIELD STRENGTH
The measurement of the cleavage fracture strength by means of an instrument impact test
[PB82-206806] N83-10183

Z

ZETA PINCH
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] N83-10935
ZINC COATINGS
Corrosion of architectural and structural metals and metal coatings in South Africa
[PB82-185869] N83-10181
ZIRCONIUM
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment
[PB82-194895] N83-10187

PERSONAL AUTHOR INDEX

Typical Personal Author Index Listing



Listings in this index are arranged alphabetically by personal author. The NASA accession number denotes the number by which the citation is identified.

A

AAMODT, R. E. N83-10941
ABARBANEL, H. D. I. N83-10946
ABBEY, K. M. N83-10134
ABDOU, M. A. N83-10958
ABDU, M. A. N83-10679
ABOO, A. N83-10591
ACHTEMEIER, G. L. N83-10721
ACKEN, C. N83-10816
ACKERMAN, P. L. N83-10778
ADAMS, E. E. N83-10667
ADAMS, J. A. N83-10605
AGNEW, C. E. N83-10840
AGRE, J. R. N83-10847
AIKEN, G. R. N83-10158
AKIMOVA, A. F. N83-10741
ALEXANDER, P. N83-10347
ALIAN, S. E. D. N83-10753
N83-10754
ALLENDER, J. H. N83-10738
ALVARADO, D. R. N83-10645
ALVARADO, U. R. N83-10646
ALYEA, F. N83-10646
AMES, E. E. N83-10346
ANDERSON, C. F. N83-10186
ANDERSON, E. R. N83-10419
ANDREOU, S. A. N83-10472
ANG, P. G. N83-10161
ANSARAI, R. N83-10318
ANSON, B. N83-10545
ANTYPAS, G. A. N83-10137
APPLEGATE, J. K. N83-10474
ARMSTRONG, V. D. N83-10344
ARNELL, V. N83-10299
ARTBAUER, J. N83-10370
ARTHUR, M. G. N83-10341
ASHBY, M. F. N83-10454
ASHURST, T. A. N83-10077
ASPROUDIS, S. C. N83-10868
ASTER, R. W. N83-10524
ATKINSON, R. H. N83-10280
ATKINSON, W. H. N83-10044
ATTENBERGER, S. E. N83-10943
AUBRUN, J. N. N83-10441
AUDIBERT, M. N83-10542
AUGUSTINE, F., JR. N83-10947
AWAYA, H. N83-10548
AYERS, D. J. N83-10426

B

BACA, L. S. N83-10858
BACHMAN, A. L. N83-10638
BAES, C. F., JR. N83-10968
BAGCI, C. N83-10257
BAIHUA, Z. N83-10362
BAILEY, A. J. N83-10027
BAILEY, D. G. N83-10027
BAILEY, R. E. N83-10072
BAKER, C. C. N83-10938
BAKKER, J. T. N83-10073
BALLING, R. J. N83-10278
N83-10279
BANKS, B. A. N83-10170
BANKS, S. P. N83-10853
BANNISTER, K. A. N83-10263
BARAONA, C. R. N83-10555
BARBA, J. N83-10317
BARBER, R. E. N83-10533
BARKER, J. C. N83-10485
BARNES, J. C. N83-10728
BARNSTON, A. G. N83-10727
BARRETTI, M. D. S. N83-10326
N83-10964
BARRON, T. N83-10788
BARROWS, R. D. N83-10156
BASILEO, M. A. N83-10741
BASSANI, J. L. N83-10205
BATCHELDER, J. S. N83-10902
BATCHELOR, D. B. N83-10936
BATHKE, C. G. N83-10945
BATTS, G. W. N83-10108
BAUMEISTER, K. J. N83-10885
BAUMGARDNER, M. F. N83-10712
BAUR, G. N83-10621
BAUR, J. C. N83-10280
BAUTE, M. N83-10371
BEATRICE, E. S. N83-10766
BEATTIE, A. G. N83-10476
BECK, W. E., JR. N83-10019
BECKER, M. N83-10866
BECKWITH, A. N83-10788
BEDARD, R. N83-10527
BEEBE, K. W. N83-10557
BEER, J. M. N83-10669
BEH, H. N83-10059
BEHIE, G. N83-10483
BEKEFI, G. N83-10934
N83-10939
N83-10949
BELENCAN, H. N83-10593
BENNETT, J. R. N83-10489
BERK, G. N83-10325
BERK, H. L. N83-10929
BERNHARDT, J. N83-10761
BERNIER, R. J. N83-10406
BERNREUTER, D. L. N83-10699
BERS, A. N83-10932
N83-10933
BERTRAM, B. N83-10993
BHALME, H. N. N83-10731
BHAT, R. B. N83-10260
BHATTACHARYYA, A. N83-10418
BICKLER, D. B. N83-10522
BIDDLECOMBE, C. S. N83-10375
BIEHL, K. N83-10041
BIENIOSEK, F. M. N83-10948
BIGGS, D. L. N83-10572
BILSON, E. N83-10213
BIRK, J. R. N83-10788
BIRLINGMAIR, D. N83-10573
N83-10574
BITTNER, H. N83-10101
BLAANFORD, M. L. N83-10814
BLINK, J. A. N83-10819
BLUE, J. L. N83-10376
BODA, F. P. N83-10533
BOEHM, K. H. N83-10997
BOEN, G. E. N83-10029
BOHN, T. S. N83-10958
BOLLING, M. N83-10660
BONNET, D. N83-10620
BONOLI, P. I. N83-10934
BOOKER, D. N83-10070
BORGES, H. G. V. S. N83-10971
BORISOV, V. T. N83-10163
BORTNER, M. H. N83-10645
N83-10646
BORTON, D. N. N83-10535
BOWYER, J. N83-10548
BRADY, J. V. N83-10777
BRAFF, M. N83-10316
BRANDHORST, H. W., JR. N83-10962
BRAUN, D. N83-10037
BRAUNER, G. N83-10432
BRAUSER, K. N83-10062
BREHM, W. F. N83-10846
BREIDUNG, P. N83-10615
BRENNER, P. N83-10859
BRENNER, S. P. N83-10344
BRINKEN, K. N83-10428
BRINZA, V. N. N83-10128
BROCKMAN, R. A. N83-10810
BRODEUR, P. N83-10788
BROOKS, J. N. N83-10936
BROOKS, T. H. N83-10111
N83-10112
BROUTMAN, L. J. N83-10204
BROWN, D. L. N83-10247
BROWN, N. N83-10205
BROWN, S. F. N83-10350
BRUEGGENDIECK, S. N83-10336
BRUNER, T. S. N83-10810
BRUNISH, W. M. N83-11002
BRUNO, F. M. N83-10360
BRUNSMANN, U. N83-10620
BRYANT, M. D. N83-10439
BRZEZINSKI, J. N83-10861
BUCH, W. N83-10368
BUCHACKER, E. N83-10078
BUCHER, E. N83-10632
BUCKLEY, D. N83-10171
BUEKER, P. A. N83-10804
BUESCH, S. C. N83-10595
BUFTON, J. L. N83-10903
BURATTINI, E. N83-10969
BURCHFIEL, B. C. N83-10675
BURKLAND, P. N83-10477
BURNSIDE, W. D. N83-10323
BURTON, B. W. N83-10694
BYRNE, H. M. N83-10743

C

CAIDEN, K. C. N83-10167
CALDER, J. A. N93-10746
CALDWELL, L. R. N83-10270
CALKINS, J. N83-10660
CALLAGHAN, B. G. N83-10182
CALLAGHAN, W. T. N83-10507
CALLEN, J. D. N83-10940
CAMPBELL, W. J. N83-10465
CANNON, T. W. N83-10364
CANONICO, C. M. N83-10968
CAPPUCCIO, G. N83-10969
CARNEY, J. F., III N83-10300
CARPENTER, J. A. N83-10790
CARR, W. J. N83-10690
CARRERAS, B. A. N83-10940
N83-10942
CARTER, J. E. N83-10018
CARTER, R. C. N83-10784
CARUSO, H. N83-10221
CARY, J. N83-10829
CARY, J. R. N83-10881
N83-10946
CASH, D. J. N83-10698
CATON, J. E. N83-10116
CATTO, P. J. N83-10941
N83-10955
CAVAGE, W. N83-10041
CAYES, L. N83-10292
CAZIER, F. W., JR. N83-10035
CEBULA, W. N83-10144
CHAGANTY, N. R. N83-10670
CHALMERS, B. B. N83-10605
CHAN, P. C. T. N83-10386
CHAN, R. K. C. N83-10212
CHANAN, G. A. N83-10995
CHANDLER, E. A. N83-10384
CHANDLER, G. I. N83-10907
CHANG, D. N83-10931
CHANG, J. N83-10889
CHANG, L. N83-10007
CHANG, R. K. N83-10150

CHANG, S. S. N83-10153
CHARAGUNDLA, S. R. N83-10579
CHAREN, T. N83-10773
CHAUDIERE, D. A. N83-10177
CHEHOVITS, J. G. N83-10305
CHEN, B. H. N83-10139
CHEN, H. S. N83-10568
CHEN, J. S. N83-10756
CHEN, K. I. N83-10934
CHEN, P. P. S. N83-10986
CHEN, R. T. N83-10166
CHEN, R. T. N. N83-10051
CHENG, C. Y. N83-10148
N83-10149
CHERESHAROV, L. N83-10749
CHESLER, S. N83-10200
CHESTNUTT, D. N83-10883
CHINNERY, M. A. N83-10686
CHIOU, M. J. N83-10212
CHRIEN, R. E. N83-10926
CHRISTIANSEN, W. H. N83-10420
CHRISTMAN, W. M., III N83-10587
CHU, F. H. N83-10236
N83-10259
CHUN, H. M. N83-10111
N83-10112
CHUNG, D. H. N83-10699
CHUNG, I. N83-10986
CHURNEY, K. L. N83-10580
CIAMPI, V. N83-10279
CIVIDANES, L. B. T. N83-10327
CLARK, D. B. N83-10199
CLARK, J. W., JR. N83-10056
CLARK, T. L. N83-10673
CLARKE, C. K. P. N83-10308
CLAUSING, A. M. N83-10500
CLEMENT, T. M. N83-10047
CLEMMER, R. G. N83-10938
CLOUGH, R. W. N83-10277
CLOYD, R. A. N83-10424
COATE, D. N83-10302
COFFEY, H. E. N83-11008
N83-11009
COLBERG, W. R. N83-10113
COLLEY, E. N83-10660
COLLIER, F. N83-10383
COOMBS, M. G. N83-10543
COOPER, J. D. N83-10702
COPLEY, J. C. N83-10269
COPPI, B. N83-10934
CORNILLON, P. N83-10483
CORT, G. N83-10985
CORYNEN, G. C. N83-10869
COULBERT, C. D. N83-10521
COVINO, B. S., JR. N83-10187
COX, S. N83-10466
COY, J. J. N83-10425
CRAWFORD, J. D. N83-10946
CREGO, D. F. N83-10589
CRIPPS, B. E. N83-10652
CROSSAN, T. R. N83-10733
CROUCH, J. N83-10788
CROWSON, R. D. N83-10237
CRUCIUS, M. N83-10368
CSONKA, P. L. N83-10408
CUDDIHY, E. N83-10553
CUNKAI, W. N83-10906
CUNNINGHAM, T. B. N83-10075
CURREN, A. N. N83-10117

D

DAILEY, C. L. N83-10114
DAKE, L. S. N83-10177
N83-10609
DALE, J. M. N83-10289
DALY, J. C. N83-10795
DANK, L. I. N83-10427
DARGAN, A. D. N83-10154
DARNELL, R. R. N83-10093
DAUGHERTY, K. E. N83-10591
DAVENPORT, J. M. N83-10825
DAVIES, M. N83-10254
DAVIS, H. N83-10342
DAVIS, S. B. N83-10544
DAVIS, W. A. N83-10948
DAVIS, W. T. N83-10407
DAWSON, B. N83-10254
DEADRICK, F. J. N83-10691
DECARLO, R. N83-10358
DECKER, D. T. N83-10913
DECKER, W. A. N83-10051
DEFEO, P. N83-10048
DEGONZALES, A. L. D. N83-10677
DEIS, G. A. N83-10958
DEJONG, T. N83-10452
N83-10453
DEKANG, X. N83-10036
DEKITSCH, A. N83-10624
DELACRUZ, R. V. N83-10703
DELUISI, J. J. N83-10711
DELVIGS, P. N83-10118
DEMARRAIS, G. A. N83-10673
DEMEDEIROS, R. T. N83-10678
DEMETRI, E. P. N83-10290
DEMEYER, F. N83-10563
DEMUSCHEWSKI, H. N83-10371
DEPASQUALE, R. J. N83-10195
DERENNASOUZA, C. N83-10971
DERKIURGEHIAN, A. N83-10287
DERRICK, W. L. N83-10779
DERYDER, L. J. N83-10645
DESSIMOZ, J. N83-10788
DEVENUTO, F. N83-10649
N83-10764
DEVEREUX, R. S. G. N83-10173
DEWALD, B. N83-10951
DEWEY, K. F. N83-10734
DEWINTER, G. N83-10102
DEYOUNG, R. J. N83-10420
DHARMADHIKARI, V. S. N83-10567
DIAS, S. N83-10174
DIEDERICH, L. N83-10062
DIESSNER, A. N83-10368
DIETRICH, D. E. N83-10212
DIETSCH, W. N83-10374
DINEEN, J. N83-10568
DINGLE, A. N. N83-10648
DION, D. R. N83-10212
DITMARS, J. D. N83-10650
DITZLER, H. N83-10631
DLABAL, M. L. N83-10901
DOANE, D. N83-10048
DOLLAND, C. R. N83-10345
DOMALSKI, E. S. N83-10580
DONN, B. N83-10998
DREXLER, J. N83-10144
DRITZ, K. W. N83-10832
DUB, V. S. N83-10175
DUDNEY, C. S. N83-10751
DUNHAM, R. E., JR. N83-10024
DUNHAM, R. S. N83-10228
DUNNING, M. J. N83-10394
DUTRA, S. L. G. N83-10677
DUTTON, E. J. N83-10343
DYRDAHL, R. N83-10220

E

EAGLESON, P. S. N83-10472
EASTERLY, C. E. N83-10751
EATOCK, B. C. N83-10882
EBERENDU, A. N83-10591
EBERSBACH, K. F. N83-10618
ECHOLDS, E. F. N83-10348
EDWARDS, C. B. N83-10375
EFENDIEV, S. M. N83-10969
EGLIMA, A. N83-10392
EHST, D. A. N83-10938
EICHMANN, G. N83-10904
EISELE, J. A. N83-10189
EKBERG, J. N83-10843
ELDRIDGE, O. C. N83-10949
ELLER, V. L. N83-10589
ELLIOTT, D. C. N83-10156
ELLIOTT, T. W. N83-10235
ELROD, S. D. N83-10172
ELTON, R. C. N83-10954
EMURIAN, H. H. N83-10777
ENGELBRECHT, A. F. N83-10877
ENGLADE, R. C. N83-10934
ENGLAND, A. C. N83-10949
ERICKSON, K. M. N83-10818
ERINGEN, A. C. N83-10450
ERNST, R. C. N83-10138
ETKIN, B. N83-10273
ETZLER, C. C. N83-10624
EVANS, K., JR. N83-10938
EVANS, R. L. N83-10672
EVERETT, W. D. N83-10234
EWINS, D. J. N83-10218
EZZEDDINE, A. N83-10944

F

FALCINELLI, R. N83-10637
FALCONER, D. R. N83-10257
FALK, E. D. N83-10411
FANDRICH, R. T. N83-10232
FANG, B. N83-10004
FARMAYAN, W. F. N83-10669
FARMER, M. G. N83-10035
FASANELLA, E. L. N83-10442
FEGLEY, R. W. N83-10711
FELICIANO, A. N83-10971
FELKER, A. D. N83-10344
FELSENTREGER, T. L. N83-10674
FERRISS, D. H. N83-10169
FERRY, J. G. N83-10756
FERTIS, D. G. N83-10970
FESEN, C. G. N83-10683
FETT, T. N83-10198
FETZER, K. N83-10101
FEURING, K. N83-10162
FICHTE, R. N83-10630
FICHTEL, C. N83-11010
FIDDES, S. P. N83-10391
FIELD, J. E. N83-10020
FIELDS, D. E. N83-10828
FIELDS, R. J. N83-10454
FISCHER, A. N83-10818
FISCHER, W. N83-10652
FISHER, A. S. N83-10934
FISHER, R. N83-10573
FISK, A. D. N83-10779
FITTERMAN, D. V. N83-10701
FIVOZINSKY, S. P. N83-10775
FLADERER, R. N83-10625
FLAHERTY, J. E. N83-10392
FLEMING, W. J. N83-10353
FLETCHER, J. G. N83-10794
FLINN, D. R. N83-10190
FLORES, F. N83-10208
FOGER, E. N83-10111
N83-10112
FOLDER, P. N83-10646
FONESKA, G. U. N83-10267
FORCE, R. K. N83-10757
FORD, L. B. N83-10501
FORESTIERI, A. F. N83-10555
FORMAN, R. N83-10117
FORREST, R. D. N83-10049
N83-10050
FORSTER, R. N83-10797
FORSTER, S. W. N83-10124
FORWARD, R. L. N83-10404
FOWLER, G. F. N83-10446
FOX, G. N83-10524
FOX, G. L. N83-10256
FOX, T. N83-10876
FRANK, H. A. N83-10504
FRANK, K. H. N83-10292
FREDEN, S. C. N83-10469
FREIBERG, R. N83-10237
FREY, W. E. N83-10555
FRIEDRICHS, H. J. N83-10719
FRIPPEL, G. G. N83-10645
N83-10646
FRITZSCHE, A. N83-10624
FROLOV, N. V. N83-10427
FROUNFELKER, R. N83-10593
FUCHS, H. N83-10718
FUCHS, V. N83-10932
FUESSL, B. N83-10620
FUHRMANN, F. N83-10615
FUJITA, T. N83-10548
FURUYA, O. N83-10604

G

GAABO, R. J. N83-10027
GADKOWSKI, M. N83-10498
GAFFNEY, P. W. N83-10824
N83-10940
GAKIS, A. N83-10374
GALVAO, B. D. S. M. C. N83-10353
GAO, Z. N83-10007
GARCIA, L. N83-10942
GARMANY, J. D. N83-10688
GARMIRE, E. N83-10905
GARY, B. L. N83-10040
GASKELL, P. S. N83-10310
GATES, W. R. N83-10547
N83-10551
GAUME, J. G. N83-10025
N83-10026
GAUSS, A., JR. N83-10333
GAUSS, R. C. N83-10437
GAUTHIER, M. K. N83-10350
GAVRILOVA, L. I. N83-10363
GEGBE, H. N83-10591
GEHRELS, N. N83-11003
GEINOPOLOS, A. N83-10662
GENTRY, K. N83-10793

GENUNG, R. K. N83-10585
GERARDI, T. G. N83-10270
GERDES, R. M. N83-10049
N83-10050
GERKEN, H. N83-10397
GERSTMANN, J. N83-10290
GEZARI, D. Y. N83-10999
GHANAAT, Y. N83-10277
GIBSON, J. C. N83-10058
GIESELER, P. B. N83-10344
GIFFORD, R. V. N83-10034
GILES, C. L. N83-10884
GILL, C. N83-10361
GILL, M. N83-10154
GILPATRICK, L. O. N83-10968
GIRNUS, R. N83-10397
GLADENBECK, J. N83-10336
GLANDON, S. R. N83-10828
GLASER, R. E. N83-10791
GLASGOW, E. R. N83-10019
GLATTHAAR, R. N83-10369
GLINKOV, G. M. N83-10165
GLOWIENKA, J. C. N83-10948
GOCKENBACH, E. N83-10368
GOEBBELS, K. N83-10431
GOETZBERGER, A. N83-10621
GOLAY, M. W. N83-10668
GOLD, T. N83-10213
GOLDBERG, V. R. N83-10530
GOLDFINGER, R. C. N83-10836
GOLDSTEIN, K. W. N83-10056
GOLDSTEIN, M. L. N83-11007
GONG, Z. N83-10012
GONZALES, A. W. L. N83-10677
GONZALEZ-SANABRIA, O. N83-10135
GORADIA, C. N83-10962
GORCHILIN, N. I. N83-10427
GORDON, G. H. N83-10113
GOREE, J. G. N83-10448
N83-10449
GORSKII, A. V. N83-10175
GORSTEIN, M. N83-10083
N83-10084
N83-10085
N83-10086
N83-10087
GOTAC, P. R. N83-10382
GOURLAY, J. S. N83-10805
GRAHAM, L. J. N83-10887
GRAMMA, R. N83-10788
GRANDOLFO, M. N83-10969
GRANNEMANN, W. W. N83-10567
GRAY, L. S. N83-10833
N83-10834
GREBOGI, C. N83-10946
GREEN, P. K. N83-10038
GREER, R. T. N83-10576
GRENDA, R. N. N83-10645
N83-10646
GRESCH, H. N83-10652
GRESS, D. L. N83-10291
GRIBIK, J. A. N83-10255
GRIFFIN, G. D. N83-10751
GRIFFIN, J. N83-10591
GRIFFITH, C. G. N83-10730
GRIFFITH, J. M. N83-10873
GRIGORYAN, V. A. N83-10164
GRIMM, K. R. N83-10331
GROSS, J. N83-10631
GRUHL, J. N83-10302
GRUNDMANN, A. N83-10101
GRUNWALD, A. J. N83-10803
GUAY, P. J. N83-10606
GUENTHER, G. C. N83-10707
GUERRA, C. R. N83-10590
GULLIVER, J. S. N83-10482
GUNN, J. E. N83-11000
GUNTERMANN, K. N83-10615
GUNTUR, R. R. N83-10226

H

HABIB-AGAHI, H. N83-10503
HACKETT, K. E. N83-10934
N83-10949
HAFTKA, R. T. N83-10388
HAGLUND, R. A. N83-10539
HAGMAN, J. D. N83-10781
HAIDER, G. N83-10132
HALBLEIB, J. A. N83-10896
HALDER, A. N83-10708
HALL, J. N83-10788
HALL, P. S. N83-10240
HALLEN, R. T. N83-10156
HALLQUIST, J. O. N83-10822
HALSEY, H. N83-10645
HAMILL, M. L. N83-10702
HAMILTON, M. B. N83-10984
HAMZA, R. N83-10668
HAN, C. C. N83-10197
HANCHER, C. W. N83-10585
HANKE, D. N83-10064
HANKINS, B. E. N83-10151
HANSEN, J. S. N83-10273
HANSON, D. R. N83-10493
HANSON, R. J. N83-10626
HARDY, R. D. N83-10088
HARMON, S. H. N83-10116
HARRIS, H. C. N83-10342
HARRISON, T. D. N83-10598
HARTEN, A. N83-10856
HARTEN, L. N83-10932
HASHIMOTO, S. N83-10916
HASKELL, K. N83-10841
HATZIPROKOPIOU, M. E. N83-10496
HAUG, A. N83-10719
HAUGER, J. S. N83-10534
N83-10535
HAUX, U. N83-10069
HAXO, H. E., JR. N83-10306
HAYES, P. D. N83-10788
HAZELWORTH, J. B. N83-10742
HE, G. N83-10011
HE, J. N83-10007
HECHT, J. H. N83-10998
HEDEMANN, M. A. N83-10925
HEFFLEY, R. K. N83-10047
HEGG, D. R. N83-10111
N83-10112
HEICHEL, D. J. N83-10767
HEIDER, K. N83-10621
HEIM, R., JR. N83-10734
HEIMKE, G. N83-10614
HEINBOCKEL, J. H. N83-10963
HEINE, D. N83-10627
HEINER, G. N83-10432
HEINS, C. P. N83-10276
HELFER, H. L. N83-10998
HELLQVIST, K. N83-10242
N83-10243
N83-10244
HELLWIG, U. N83-10142
HENEIN, N. A. N83-10430
HENNON, G. J. N83-10581
HERFT, R. N83-10336
HERKERT, C. M. N83-10037
HERLING, A. M. N83-10569
HERMAN, H. N83-10938
HESS, R. A. N83-10079
HICHO, G. E. N83-10147
HICKS, H. R. N83-10940
N83-10942
HIEBERT, K. L. N83-10826
HILL, C. K. N83-10108
HILL, S. D. N83-10188
HILLIS, D. L. N83-10948
HILLMAN, J. C. N83-10990
HILPERT, L. N83-10200
HINO, T. N83-10286
HIRSCH, K. N83-10422
HIRSHMAN, S. P. N83-10807
N83-10928
HIVELY, L. M. N83-10943
HOAG, J. H. N83-10503
HODGE, D. B. N83-10320
HODGE, R. C. N83-10597
HODGKINSON, J. N83-10057
N83-10063
HOEHLEIN, B. N83-10495
HOFFMAN, J. D. N83-10389
HOFMANN, F. N83-10652
HOFMANN, N. N83-10374
HOH, R. H. N83-10063
HOHFELDER, J. J. N83-10476
HOLGATE, S. H. N83-10780
HOLMES, J. A. N83-10942
HOLMES, J. E. N83-10046
HOLROYD, F. W. N83-10367
HOLSTEIN, W. N83-10127
HONG, C. N83-10887
HOOD, D. W. N83-10746
HOTZ, E. R. N83-10247
HOU, Z. N83-10010
HOULBERG, W. A. N83-10807
N83-10943
N83-10957
HOWELL, B. F. N83-10200
HSIA, J. J. N83-10909
HSU, P. Y. N83-10958
HSU, S. M. N83-10199
HUFF, F. A. N83-10723
HUFNAGEL, H. N83-10101
HUIBREGTSE, K. R. N83-10662
HULSEY, C. N83-10660
HUMPHRIES, S., JR. N83-10894
HUNT, C. P. N83-10133
HUNTER, A. T. N83-10959
HUNTER, R. O. N83-10912
HUNTSMAN, B. W. N83-10771
HUSSAIN, N. N83-10864
HUSSMANN, E. N83-10622
HUSTON, N. E. N83-10411
HUTCHINSON, D. P. N83-10953
HYOVALTI, D. C. N83-10343

I

IANNARELLI, F. N83-10076
IBRAHIM, S. R. N83-10258
ICHIYOSHI, S. N83-10002
IGELBUESCHER, H. N83-10852
IGNATEV, V. G. N83-10363
IKE, C. N83-10591
IKEDA, M. N83-10915
IMAN, R. L. N83-10825
INGO, G. N83-10372
INSUIK, R. J. N83-10420
INTERRANTE, C. G. N83-10147
IRANI, J. N83-10440
IRVOAS, J. N83-10074
ISHII, C. N83-10002

J

JACKSON, C. H. N83-10113
JACOBER, R. P., JR. N83-10475
JACOBSON, R. A. N83-10571
JACQUES, M. T. N83-10669
JAEGER, H. N83-10620
JAHODA, F. C. N83-10907
JALALABADI, H. N83-10444
JAMEEL, M. N83-10499
JAMES, R. J. N83-10228
JEAN, P. H. N83-10325
JENSEN, R. N. N83-10566
JESSUP, A. T. N83-10489
JOBE, J. B. N83-10780
JOHNSON, A. M. N83-10960
JOHNSON, B. R. N83-10709
JOHNSON, C. N83-10210
JOHNSON, C. D. N83-10223
JOHNSON, D. L. N83-10108
JOHNSON, W. T. N83-10092
JONES, D. I. G. N83-10261
JONES, G. J. N83-10511
JONES, R. N83-10797
JONES, R. M. N83-10744
JONES, V. J. N83-10747
JONKERS, H. L. N83-10053
JORDAN, J. N. N83-10487
JOSHI, S. M. N83-10110
JUDD, D. L. N83-10930
JUNG, J. N83-10938
JUNYIN, F. N83-10906

K

KAAKINEN, J. N83-10158
KABAMBA, P. T. N83-10846
KAHN, W. D. N83-10674
KAHN, W. K. N83-10332
KALINOWSKI, A. J. N83-10229
KAMEI, E. N83-10205
KANJILAL, P. P. N83-10178
N83-10179
KAPITZ, H. N83-10431
KAPPETIJN, F. K. N83-10053
KARFAKIS, M. N83-10703
KARKALITS, O. C. N83-10151
KARLSSON, V. N83-10152
KAUFMAN, A. N. N83-10946
KAUFMAN, J. T. N83-10667
KAUFMAN, M. N83-10981
KAWAHATA, K. N83-10918
KAWATA, S. N83-10915
N83-10917
KAZANAS, D. N83-11011
KAZANJIAN, A. R. N83-10141
KEAFER, L. S. N83-10645
KEARNEY, D. W. N83-10285
KEENAN, M. M. N83-10983
KELLEHER, J. J. N83-10569
KELLEY, R. N83-10788
KERN, E. N83-10515
KEY, D. L. N83-10065

KHALAFALLA, S. E. N83-10186
KHLYANKOV, N. A. N83-10175
KICENIUK, T. N83-10531
N83-10536
KIDNAY, A. J. N83-10160
KIENHOLZ, D. A. N83-10223
KIM, K. N83-10703
KINCHEN, R. W. N83-10288
KINDNESS, S. W. N83-10776
KINGERY, W. D. N83-10967
KINNEY, J. S. N83-10759
KIPP, M. E. N83-10396
KISSEL, L. N83-10890
KISSELL, G. J. N83-10111
N83-10112
KITECK, P. D. N83-10886
KITTLESON, J. K. N83-10378
KITTO, W. G. N83-10077
KJELGAARD, S. O. N83-10016
KLARE, K. A. N83-10812
KLEIN, H. H. N83-10212
KLEINSTREUER, C. N83-10392
KLIMA, S. J. N83-10555
KLIMEK, K. H. N83-10428
KLINCK, D. M. N83-10025
N83-10026
KLINKER, F. N83-10043
KLYUCHARAV, V. E. N83-10175
KNIEL, U. N83-10651
KNIFFEN, D. N83-11010
KNIGHT, P. N83-10313
KNORR, R. J. N83-10425
KNOWLTON, S. F. N83-10934
KOCHS, H. D. N83-10432
KODALI, S. N83-10385
KONG, F. Y. N83-10383
KONOVALOV, B. N83-10714
KOSMAHL, H. G. N83-10322
KOSTEK, C. N83-10952
KOTCHICK, D. M. N83-10543
KOTHANDARAMAN, V. N83-10672
KOTILLAINEN, H. N83-10183
KOVACHEV, G. N83-10749
KRAFT, M. N83-10626
KRAHN, F. N83-10336
KRAIMAN, H. N83-10646
KRAJCINOVIC, D. N83-10267
KRAKOWSKI, R. A. N83-10945
KRASINSKII, V. V. N83-10175
KRASNICKI, E. J. N83-10227
KRAUS, S. N83-10431
KRAUS, W. N83-10069
KREISCHER, K. E. N83-10365
KRETZ, M. N83-10066
KRITIKOS, H. N83-10645
KRIVOSH, S. M. N83-10128
KROEMER, E. J. N83-10705
KROFTA, M. N83-10653
KROWITZ, L. N83-10646
KRUG, M. P. N83-10185
KRUGER, J. E. N83-10307
KRUTZEN, F. N83-10101
KUBASCO, A. J. N83-10560
KUDRYAZTSEVA, A. P. N83-10427
KUEHL, M. N83-10623
KUGA, H. K. N83-10352
KULCHAR, A. G. N83-10949
KULKARNI, S. V. N83-11017
KURTH, M. N83-10615
KUSHNER, A. S. N83-10228
KUZKO, Y. P. N83-10427
KWAN, T. N83-10829

L

LACY, J. H. N83-11001
LAGNESE, T. N83-10261
LAHN, T. G. N83-10027
LAIRD, D. H. N83-10212
LAMBERT, R. G. N83-10266
LAMBERTS, H. N83-10101
LANE, R. L. N83-10509
LANGE, H. H. N83-10064
LANGHALS, H. N83-10621
LANGLAND, R. A. N83-10473
LANKAU, Y. M. N83-10427
LANZANO, P. N83-10689
LAO, L. L. N83-10807
LARSON, D. R. N83-10416
LARSON, J. C. N83-10027
LAUNDER, B. E. N83-10380
LAURAITIS, K. N. N83-10121
LAVIN, M. L. N83-10503
LAWRENCE, R. J. N83-10396
LAYER, G. N83-10618
LEBACQZ, J. V. N83-10049
N83-10050
LECREN, R. T. N83-10560
LEDFORD, A. E. N83-10580
LEE, C. A. N83-10586
LEE, S. Y. N83-10272
LEE, T. C. N83-10320
LEE, X. S. N83-10941
LEEPER, R. J. N83-10889
LEFFEL, C. S., JR. N83-10640
LEFKOVITS, H. C. N83-10838
LEFTWICH, P. W. N83-10732
LEGATE, P. H. C. N83-10309
LEIBOWITZ, H. M. N83-10537
LEIPOLD, M. H. N83-10508
LEJAK, G. N83-10336
LEONARD, S. L. N83-10512
LEVIN, H. N83-10501
LEVINE, H. B. N83-10212
LEVINE, H. S. N83-10264
LEVINE, L. N83-10762
LEVINE, S. R. N83-10045
LEVY, J. N83-10401
LEWIS, B. T. R. N83-10688
LEWIS, C. E. N83-10343
LI, R. Y. P. N83-10457
LI, S. S. N83-10966
LI, Z. N83-10007
N83-10013
LIBERMAN, D. A. N83-10893
LIEB, E. H. N83-10893
LIEBERT, C. H. N83-10045
LILIEN, G. L. N83-10296
LIN, J. C. N83-10111
LIN, J. G. N83-10112
LIN, S. S. N83-10098
LIND, M. A. N83-10177
N83-10609
LINK, A. W. N83-10975
LINKENS, D. A. N83-10753
N83-10754
LIPSKY, S. R. N83-10140
LIRON, M. L. N83-10839
LITVAK, V. A. N83-10175
LIU, S. N83-10297
LOB, A. N83-10765
LOBODA, A. S. N83-10175
LOCKNER, T. R. N83-10894
LOCKWOOD, G. J. N83-10896
LODEN, W. A. N83-10265
LOHR, K. N83-10660
LONGHURST, G. R. N83-10958
LORCH, G. N83-10624
LORD, D. N83-10477
LORENZEN, B. N83-10719
LORING, C. M. N83-10949
LOVBERG, R. H. N83-10114
LOVELL, T. W. N83-10366
LOWNIE, R. W., JR. N83-10180
LUCAS, J. W. N83-10525
LUCKHARDT, S. C. N83-10934
LUEBKE, E. D. N83-10823
LUEHRMANN, H. N83-10368
LUETZOW, H. B. V. N83-10685
LUMIA, R. N83-10720
LUND, D. J. N83-10766
LUOTO, R. E. N83-10025
N83-10026
LURIA, S. M. N83-10759
LUTWACK, R. N83-10519
LYBANON, M. N83-10738
LYNCH, V. E. N83-10942
LYNER, A. G. N83-10314
LYON, R. H. N83-10434
LYTLE, R. J. N83-10691

M

MA, C. H. N83-10953
MA, M. T. N83-10341
MABEY, D. G. N83-10052
MACEK, A. N83-10579
MACHENS, U. N83-10633
MADDOX, R. A. N83-10722
MADDOX, S. R. N83-10813
MADDUX, A. S., JR. N83-10851
MAEKAWA, S. N83-10604
MAGRATH, H. A. N83-10039
MAHAJAN, V. N. N83-10111
N83-10112
MAHONE, D. E. N83-10605
MAHONEY, A. R. N83-10610
MAKINO, M. N83-10002
MALCOLM, R. L. N83-10158
MALET, L. M. N83-10563
MALKUS, D. S. N83-10388
MALMSTROEM, B. N83-10976
MALON, D. M. N83-10865
MANCL, D. M. N83-10802
MANGER, C. L. N83-10190
MANIER, G. N83-10718
MANZO, M. N83-10135
MARDER, B. M. N83-10409
MARGON, B. N83-10995
MARGULIES, G. N83-10441
MARINO, J. B. N83-10340
MARKIEWICZ, R. D. N83-10474
MARKOV, A. B. N83-10028
MARPLE, C. G. N83-10407
MARQUES, V. D. S. N83-10716
MARSHALL, P. M. N83-10326
N83-10351
N83-10354
N83-10355
MARSHALL, T. C. N83-10952
MARTIN, I. M. N83-10677
MARTIN, K. E. N83-10350
MARTINS, H. N83-10788
MARX, C. N83-10705
MASSON, L. S. N83-10958
MATANOSKI N83-10770
MATHE, P. L. N83-10060
MATHEWS, F. H. N83-10248
N83-10249
MATHEY, E. L. N83-10817
MATHIPRAKASAM, B. N83-10207
MATTAS, R. F. N83-10938
MATTHAEUS, W. H. N83-11007
MATTHEWS, K. N83-10995
N83-11001
MATTKE, T. W. N83-10482
MAUEL, M. E. N83-10950
MAURO, C. A. N83-10809
MAYER, H. N83-10614
MAYES, R. L. N83-10301
MAYNARD, J. A. N83-10330
MAYSILLES, J. H. N83-10191
MAZER, J. A. N83-10565
MAZUMDER, M. K. N83-10412
MCCABE, L. N83-10083
N83-10084
N83-10085
N83-10086
N83-10087
MCCAIN, W. E. N83-10017
MCCARTHY, R. M. N83-10588
MCCLELLAND, G. E. N83-10189
MCCLURE, G. W. N83-10409
MCCOWN, D. L. N83-10650
MCCUNE, R. A. N83-10185
MCDERMOTT, F. S. N83-10939
MCDONALD, G. E. N83-10494
MCDONALD, R. R. N83-10505
MCFARLAND, N. J. N83-10698
MCGLAUN, J. M. N83-10820
MCKAY, K. N83-10070
MCKAY, L. N83-10755
MCLEOD, P. C. N83-10412
MCMAHON, P. E. N83-10120
MCVEY, J. B. N83-10556
MEAD, J. M. N83-10999
MECKING, B. A. N83-10899
MEDRANO, R. A. N83-10679
MEIERZUKOECKER, H. N83-10142
MEININGHAUS, W. N83-10336
MEISS, J. D. N83-10946
MEISTER, C. A. N83-10212
MEITIN, J. G., JR. N83-10730
MELLER, E. N83-10265
MENTAS, M. W. N83-10786
MENZER, R. N83-10495
MESSAGER, A. N83-10874
MESSICK, D. L. N83-10196
METZENDORF, H. N83-10619
METZGER, W. W. N83-10236
MEUSBURGER, G. N83-10797
MIERSCH, S. N83-10652
MIGNEAULT, G. E. N83-10806
MIKOLAITIS, D. W. N83-10136
MILLER, F. J. N83-10708
MILLER, G. H. N83-10896
MILLER, L. G. N83-10958
MILLER, R. H. N83-10848
N83-10849
MILLER, R. L. N83-10945
MILLER, V. R. N83-10247
MILLNER, A. E. N83-10605
MINER, D. L. N83-10566
MINOTT, P. O. N83-10900
MINSKY, M. L. N83-10848
N83-10849

MIODUSZEWSKI, D. N83-10123
MIRTH, L. N83-10361
MISOVEC, A. P. N83-10264
MISRA, B. N83-10938
MITCHELL, D. G. N83-10063
MIYOSHI, K. N83-10171
MOBLEY, C. E. N83-10180
MOECKL, B. N83-10101
MOEGEN, G. N83-10796
N83-10797
MOHR, H. N83-10357
MOHTADI, M. N83-10615
MOLION, L. C. B. N83-10716
MOLNAR, A. J. N83-10255
MOLNAR, P. N83-10675
MONTES, A. S. N83-10405
MOOG, W. N83-10651
MOOIJ, H. A. N83-10061
MOOIJ, H. P. N83-10584
MOOLEY, D. A. N83-10731
MOON, F. C. N83-10880
MOORE, H. F. N83-10210
MOORE, J. N83-10029
MOORE, T. J. N83-10555
MOORHOUSE, D. J. N83-10055
MORIARTY, J. J. N83-10569
MORRIS, A. S. N83-10833
N83-10834
MORRISON, A. D. N83-10520
MOSKOWITZ, H. M. N83-10974
MOSSMAN, P. B. N83-10772
MOTTER, A. E. N83-10605
MOURJOPOULOS, J. N83-10338
MOUSTAFA, S. N83-10541
MOWATT, T. C. N83-10485
MUELLER, A. N83-10371
MUELLER, W. N83-10624
MULLIGAN, J. J. N83-10485
MUNGER, R. B. N83-10644
MUNZ, D. N83-10198
MUNZ, P. N83-10632
MURAMATSU, H. N83-10115
MURRAY, R. C. N83-10700
MURTHA, M. J. N83-10574
MUSZYNSKA, A. N83-10261
MUZZY, D. B. N83-10530
MYRA, J. R. N83-10955

N

NAGAMATSU, K. N83-10002
NAGASE, S. N83-10115
NAGATA, A. N83-10919
NAGLE-ESHLEMAN, J. N83-10433
NEBELUNG, C. W. N83-10229
NELSON, F. C. N83-10250
NELVING, H. G. N83-10538
NERI, D. F. N83-10759
NESTE, S. L. N83-10645
NETO, A. F. M. N83-10845
NETO, A. R. N83-10352
NEUBERGER, J. W. N83-10827
NEUBERT, V. H. N83-10246
NEUGEBAUER, G. N83-10995
N83-11001
NEUHUBER, W. N83-10062
NEWCOMB, J. N83-10041
NEWMAN, E. H. N83-10323
NICHOLS, D. K. N83-10350
NICHOLS, I. L. N83-10155
NICHOLSON, D. W. N83-10252
NICHOLSON, L. A. N83-10387
NIU, K. N83-10915
N83-10917
NIXON, S. W. N83-10358
NODA, N. N83-10918
NOLAND, J. L. N83-10280
NOLDE, W. N83-10374
NOLTING, K. H. N83-10336
NONNENMACHER, A. N83-10627
NOONAN, E. F. N83-10217
NORRIS, A. N. N83-10315
NOSANOV, M. E. N83-10595
NOTARDONATO, J. J. N83-10557
N83-10559
N83-10560
NOVICK, A. S. N83-10559

O

ODAY, J. N83-10993
ODEN, L. L. N83-10185
OELMANN, A. N83-10371
OHLHORST, C. W. N83-10647
OKE, J. B. N83-11000
N83-11001
OLAGUNJU, D. O. N83-10129
OLIVEIRA, J. R. D. F. N83-10096
OLSEN, K. H. N83-10698
OMALLEY, P. N83-10699
OMSTEAD, D. R. N83-10497
ONEILL, M. J. N83-10530
OSBORN, J. C., JR. N83-10711
OSELEDKO, F. G. N83-10427
OVERLY, P. N83-10527
OWENS, D. H. N83-10852
OZYILDIRIM, H. C. N83-10125

P

PACK, D. J. N83-10821
PADGETT, C. D. N83-10195
PADIKAL, T. N. N83-10775
PAERSCH, M. N83-10615
PAEZ, T. L. N83-10241
PAGE, S. J. N83-10492
PAHLMAN, J. E. N83-10186
PAKNYS, J. R. N83-10324
PALME, J. N83-10835
PALMER, G. R. N83-10155
PANDOLF, K. B. N83-10762
PAPPA, R. S. N83-10258
PAQUETTE, J. L. N83-10808
PARKER, W. J. N83-10304
PARSHIN, Y. S. N83-10427
PATSFALL, M. N83-10782
PATTON, J. R. N83-10195
PAULSON, H. M. N83-10769
PAULSON, J. W., JR. N83-10016
PEAK, S. C. N83-10349
PEARSON, R. K. N83-10111
N83-10112
PEPIN, T. J. N83-10684
PERCIVAL, W. H. N83-10538
PEREIRA, A. E. C. N83-10677
PERI, G. N83-10542
PERRY, D. N83-10986
PERUSO, C. J. N83-10903
PETERSEN, S. R. N83-10294
N83-10401
PETERSON, E. M. N83-10027
PETERSON, J. B. N83-10712
PETERSON, J. M. N83-10596
PETITDEMANGE, C. N83-10100
PETROV, Y. N83-10749
PETROVSKII, V. A. N83-10163
PETTIT, D. E. N83-10121
PFEIFFER, K. N83-10037
PFEIFFER, W. N83-10359
PFUFF, M. N83-10451
PHELPS, D. N83-10931
PIAZZA, L. R. N83-10679
PICHAI, V. N83-10815
PIETERSEN, O. B. M. N83-10043
PIHOS, G. G. N83-10473
PIMENOV, G. A. N83-10175
PINCKNEY, D. J. N83-10158
PINTO, I. R. C. A. N83-10677
PINTO, O., JR. N83-10677
PIPHER, J. L. N83-10998
PISTER, K. S. N83-10278
N83-10279
PIVIROTTO, T. J. N83-10417
PIZZI, A. N83-10203
PLACKMEYER, J. N83-10629
PLAGMAN, B. N83-10836
N83-10837
POLAK, E. N83-10278
N83-10279
POLCYN, F. N83-10739
POLLARD, J. E. N83-10892
PONCE, D. A. N83-10480
POND, S. L. N83-10534
PONS, R. L. N83-10526
N83-10532
POOL, D. L. N83-10188
POORMAN, R. M. N83-10093
POPE, D. H. N83-10752
POPE, R. E. N83-10075
POPELKA, D. N83-10603
POPOVIC, V. P. N83-10750
PORKOLAB, M. N83-10934
N83-10939
POWELL, R. V. N83-10513
PRADO, W. D. S. N83-10676
PREUIT, L. C. N83-10592
PRICE, W. E. N83-10350
PRIMROSE, K. A. N83-10810
PRINCE, M. N83-10506
PRIZHBILYAK, G. A. N83-10427
PROMMEL, J. N83-10842
PROTHEROE, R. J. N83-11011
PRZIBILLA, H. N83-10069
PSARRAS, T. N83-10195
PULLEN, P. E. N83-10743
PURI, S. N83-10319
PYKHTAR, L. K. N83-10175

R

RABER, E. N83-10477
RALPH, E. L. N83-10514
RAM, A. N83-10933
RAMIREZ, A. L. N83-10691
RANDALL, R. L. N83-10887
RANTA, D. E. N83-10228
RAO, K. R. N83-11012
RAO, S. K. N83-10864
RAO, V. B. N83-10716
RAPISARDA, L. N83-10358
RASCOE, C. D. N83-10288
RASMUSSEN, W. T. N83-10768
RATHBONE, R. N83-10796
RATHZ, T. J. N83-10094
RAVI, K. V. N83-10516
RAVINDRAN, A. N83-10974
RAWIE, C. C. N83-10284
RAYA, A. N83-10852
RECKZIEGEL, A. N83-10614
REED, C. W. N83-10373
REEDER, D. J. N83-10200
REICHMANN, P. I. N83-10388
REIF, H. E. N83-10211
REILLY, M. L. N83-10580
REINHARDT, D. N83-10146
REINTJES, J. F. N83-10987
REITER, H. N83-10431
RENFTEL, W. N83-10370
RENGSTORFF, G. W. P. N83-10171
RENKA, R. J. N83-10827
RENNINGER, D. J. N83-10793
RENNINGER, R. G. N83-10412
RENSON, J. E. N83-10571
RETELSDORF, H. J. N83-10630
REVERE, W. N83-10548
REYNOLDS, P. A. N83-10080
RHODES, P. H. N83-10126
RICE, M. P. N83-10528
RICE, R. F. N83-10321
RICHARDSON, J. M. N83-10855
RICHARDSON, P. F. N83-10161
RICHARDSON, W. F. N83-10564
RICKETTS, R. H. N83-10035
RIEDEL, P. N83-10410
RIENSTRA, S. W. N83-10888
RILEY, W. D. N83-10187
RIOS, J. N83-10091
RITTERMAN, P. F. N83-10502
RIVERA, A. L. N83-10585
ROARK, J. J. N83-10303
ROBERTSON, S. J. N83-10387
ROBINSON, E. N83-10729
ROCHE, R. H. N83-10429
RODGERS, D. L. N83-10027
RODGERS, D. M. N83-10722
RODRIQUEZ, B. D. N83-10474
ROEDER, V. F. N83-10337
ROEGER, W. N83-10059
ROESSLER, W. N83-10620
ROFFER, C. N83-10742
ROGALLA, K. N83-10624
ROGERS, L. N83-10222
ROGERS, L. C. N83-10223
ROJAS, R. G. N83-10323
RONDE-OUSTAU, F. N83-10298
ROPERTZ, G. N83-10615
RORK, E. W. N83-10098
ROSE, E. N83-10178
N83-10179
ROSENBLUTH, M. N. N83-10829
ROSFJORD, T. J. N83-10556
ROSNER, J. C. N83-10305
ROSS, A. J. N83-10071
ROSS, M. N83-10330
ROSS, R. G., JR. N83-10523
ROSSEY, C. E. N83-10903
ROSSIGNUOLO, A. A. N83-10161
ROTH, G. S. N83-10413
ROTHMANN, H. N83-10630
ROTHOLZ, E. N83-10325
ROTTER, J. M. N83-10455
ROWELL, G. A. N83-10493
ROWLAND, J. R. N83-10855
ROY, B. N83-10339

RUGGLES, L. E. N83-10896
RUNKLE, L. D. N83-10510
N83-10523
RUSSELL, J. P. N83-10681
RYAN, D. P. N83-10413
N83-10415
RYAN, R. V. N83-10580
RYDER, J. T. N83-10121
RYERSON, D. E. N83-10696
RYSLAVSKIY, S. B. N83-10427

S

SA, L. D. D. A. N83-10715
SAFFORD, F. B. N83-10237
SAFREN, H. G. N83-10903
SAH, E. N83-10621
SAITO, J. N83-10048
SAKAI, K. N83-10916
SALEWICZ, A. N83-10498
SAMMELLS, A. F. N83-10161
SANDERS, P. J. N83-10209
SANGER, G. M. N83-11016
SANKAR, S. N83-10224
N83-10226
SANKAR, T. S. N83-10224
N83-10260
SANTANA, C. E. N83-10355
SANTO, C. M. E. N83-11012
SATHYAMOORTHY, M. N83-10436
SATO, M. N83-10918
SATO, T. N83-10287
SATTLEGGER, J. N83-10704
SAVAGE, M. N83-10425
SAWKA, M. N. N83-10762
SAWYER, D. L., JR. N83-10191
SAZAMA, F. J. N83-10245
SBISA, H. E. N83-10784
SCHAEFER, D. W. N83-10197
SCHAEFER, S. C. N83-10159
SCHARFETTER, H. G. N83-10203
SCHARFF, M. F. N83-10212
SCHEINER, B. J. N83-10188
SCHEMM, J. K. E. N83-10682
SCHETZ, J. A. N83-10383
SCHILLING, D. L. N83-10329
N83-10904
SCHLICHTING, C. L. N83-10759
N83-10776
SCHMELZLE, J. N83-10624
SCHMIDT, G. N83-10541
SCHMIDT, J. H. N83-10239
SCHMIDT, S. N83-10432
SCHMITZ, M. N83-10999
SCHNEIDER, A. N83-10211
SCHNEIDER, E. N83-10431
SCHNEIDER, W. N83-10778
N83-10779
SCHOEN, W. C. N83-10092
SCHOFIELD, B. L. N83-10077
SCHOLLMEIER, W. N83-10145
SCHRADER, L. N83-10625
SCHUBERT, G. N83-10680
SCHUBERT, M. N83-10032
SCHUCK, J. W. N83-10027
SCHUHWERK, W. N83-10624
SCHULMAN, T. M. N83-10047
SCHULTING, F. N83-10152
SCHULTZ, D. F. N83-10556
SCHUMAN, W. J., JR. N83-10237
SCHUMANN, E. H. N83-10735
SCHUSCHEREBA, S. T. N83-10766
SCHUSTER, G. B. A. N83-10166
SCHWAB, D. J. N83-10489
SCHWEDOCK, J. P. N83-10211
SCHWEGLER, B. R., JR. N83-10586
SCHWEPPE, E. N83-10302
SCIACCALUGA, A. M. N83-10911
SCOTT, H. L. N83-10814
SCOTT, M. R. N83-10841
SCOTT, R. N83-10745
SCRAPANSKY, T. A. N83-10780
SEAH, M. P. N83-10133
SEALOCK, L. J., JR. N83-10156
SECORD, N. W. N83-10602
SEDERQUIST, R. A. N83-10556
SEEGER, J. N83-10478
SEIDEL, D. C. N83-10155
SENADOR, R. N83-10677
SENICH, G. A. N83-10153
SESHADRI, T. V. N83-10233
SETHURAMAN, J. N83-10870
SETZER, F. O. N83-10344
SEZER, M. E. N83-10815
SHAFFER, A. R. N83-10717
SHAH, S. C. N83-10288
SHAKAL, A. F. N83-10700
SHAMPINE, L. F. N83-10854
N83-10858
N83-10878
SHANNON, J. A. N83-10031
SHARAN, A. M. N83-10224
SHARMA, P. N83-10864
SHARP, J. K. N83-10599
SHARPE, R. L. N83-10301
SHAW, L. L. N83-10272
SHAW, M. J. N83-10375
SHEFELBINE, H. C. N83-10476
SHEIBLEY, D. W. N83-10135
SHELL, C. N83-10829
SHELSWELL, P. N83-10312
SHEN, M. N83-10012
SHERMAN, S. W. N83-10092
SHEU, F. H. N83-10276
SHEVTSOV, E. K. N83-10165
SHIELDS, R. R. N83-10488
SHIREY, D. L. N83-10248
SHIVES, F. N83-10729
SHLACHTER, J. S. N83-10935
SHMAYDA, W. T. N83-10923
SHOR, A. J. N83-10968
SHORT, N. M. N83-10458
SHOUCRI, M. M. N83-10932
SHUKLA, A. N83-10438
SHUMWAY, K. J. N83-10982
SHURI, F. S. N83-10702
SHUTE, D. W. N83-10569
SIBLEY, E. H. N83-10799
SIELAFF, H. D. N83-10617
SIKKA, D. R. N83-10724
SIKORSKI, W. N83-10498
SILJAK, D. D. N83-10815
SIMILON, P. L. N83-10924
SIMON, A. L. N83-10970
SIMONS, R. W. N83-10818
SIMS, R. A. N83-10412
SINCLAIR, M. N83-10068
SINCLAIR, R. A. N83-10672
SINCLAIR, W. C. N83-10490
SINGH, J. J. N83-10407
SINGLETARY, J. H. N83-10590
SINGLETON, F. D., JR. N83-10498
SIRKKOLA, E. N83-10183
SISTO, F. N83-10393
SJOEGREN, P. N83-10860
SKOP, R. A. N83-10230
SKOV, A. N83-10495
SLACK, J. W. N83-10434
SLEMMONS, D. B. N83-10699
SLOAN, E. D. N83-10160
SLOUGH, J. T. N83-10910
SMALLWOOD, D. O. N83-10251
SMALLWOOD, M. D. N83-10728
SMITH, D. B. S. N83-10848
N83-10849
SMITH, D. E. N83-10809
SMITH, D. L. N83-10938
SMITH, J. H. B. N83-10391
SMITH, L. E. N83-10153
SMITH, L. G. N83-10238
SMITH, P. D. N83-10390
SMITH, P. L. N83-10867
SMITH, R. E. N83-10072
SMITH, R. G. N83-10155
SMOKLER, M. I. N83-10552
SMULLIN, L. D. N83-10944
SMUTS, J. N83-10182
SMYTH, W. H. N83-11004
N83-11005
SNYDER, R. S. N83-10126
SOCZAK, I. F. N83-10526
SOFRONIJEVIC, D. N83-10371
SOIFER, B. T. N83-10995
N83-11001
SOLENSTEN, L. N83-10948
SONI, M. L. N83-10225
SOOSAAR, K. N83-10111
SOTER, S. N83-10213
SOVEY, J. S. N83-10117
SPALVINS, T. N83-10194
SPEE, B. M. N83-10403
SPIETH, H. H. N83-10025
N83-10026
SPIGHT, C. N83-10927
SPOHN, T. N83-10680
SPONG, D. A. N83-10929
SPRINGER, J. E. N83-10697
SPRINKEL, M. M. N83-10125
N83-10292
SPROTT, J. C. N83-10366
SQUIRES, D. F. N83-10755
SQUIRES, T. G. N83-10575
SRINIVAS, B. N83-10212
SRINIVASAN, M. G. N83-10267
SRINIVASAN, V. N83-10356
STAATS, P. A. N83-10953
STABNOW, W. R. N83-10903
STAHL, H. N83-10021
STANISLAWSKI, L. N83-10783
STANKS, D. J. N83-10342
STARKE, J. N83-10101
STECKER, F. W. N83-10996
STEELE, F. K. N83-10343
STEFAN, H. G. N83-10482
STEINBERGER, W. N83-10618
STEINER, D. N83-10627
STEKETEE, J. A. N83-10398
N83-10399
STELLER, P. N83-10623
STEPHENS, P. L. N83-10473
STEPHENSON, J. W. N83-10589
STEVENS, I. N83-10768
STEWARD, W. N83-10067
STEWART, T. L. N83-10177
STICH, G. N83-10101
STIELSTRA, P. B. N83-10429
STILL, J. C. N83-10485
STINSON, D. G. N83-10965
STONE, J. C. N83-10498
STRANGE, R. R. N83-10044
STRASZHEIM, W. N83-10576
STROUD, W. J. N83-10447
STRUMPF, H. J. N83-10543
SUBKLEW, G. N83-10615
SUCKOW, U. N83-10374
SULIMMA, A. N83-10143
SUN, D. N83-10007
SUN, Z. N83-10006
SUNG, N. W. N83-10423
SUREK, T. N83-10518
SURESH, A. N83-10450
SUTTON, W. A. N83-10210
SVENDSON, K. L. N83-10487
SWAFFIELD, J. N83-10400
SWAGER, W. L. N83-10180
SWARTZ, C. K. N83-10962
SWEENEY, J. J. N83-10697
SWEGLE, J. W. N83-10857
SWETT, B. H. N83-10219
SYMONDS, R. A. N83-10557

T

TABOR, L. L. N83-10692
TAFT, J. L. N83-10748
TAJIMA, Y. N83-10967
TALBOT, P. D. N83-10051
TANG, R. W. N83-10480
TANIS, F. J. N83-10739
TANZER, H. J. N83-10379
TATCHYA, R. N83-10408
TAVARES, S. A. N83-10096
TAYLOR, E. W. N83-10311
TAYLOR, M. A. N83-10306
TEAGUE, W. J. N83-10737
TEEPLE, F. E. N83-10595
TEMPLE, P. I. N83-10605
TEMPLE, V. A. K. N83-10367
TENG, T. L. N83-10687
TERADA, K. N83-10002
TERASAWA, K. L. N83-10547
TETSUKA, T. N83-10918
THALLER, L. H. N83-10134
N83-10558
THIBAUDEAU, G. N83-10932
THIBODEAUX, J. J. N83-10082
THIMONS, E. D. N83-10492
THOMAS, A. G. N83-10335
THOMSON, W. H. N83-10688
THOSTESEN, T. N83-10526
THURMAN, E. M. N83-10158
TILLER, A. J. N83-10161
TILLMAN, J. E. N83-10710
TILOVE, R. B. N83-10863
TINLING, B. E. N83-10051
TONER, M. M. N83-10762
TOWNE, C. E. N83-10389
TRAUT, D. E. N83-10191
TRIMBLE, D. W. N83-10345
TROST, T. F. N83-10023
TROTH, D. L. N83-10559
TSAI, M. C. N83-10131
TSANG, W. N83-10582
TUDE, E. A. P. N83-10327
TUNC, S. N83-10479
TURNBULL, A. N83-10169

TURNER, C. D. N83-10023
TURNER, J. D. N83-10111
N83-10112
TWISDALE, T. R. N83-10077

U

UCKAN, N. A. N83-10956
UCKAN, T. N83-10948
UNGER, D. A. N83-10726
UNTERBERGER, R. R. N83-10695
UPTON, H. W. N83-10029
URBANIK, T. J. N83-10271
UTOCHKIN, Y. I. N83-10164

V

VAICAITIS, R. N83-10435
VANDAM, C. P. N83-10034
VANDAM, J. W. N83-10929
VANDENBRAND, J. F. J. N83-10275
VANDERAUWERA, L. N83-10563
VANDERDAM, R. F. N83-10398
VANDERSLUIS, K. L. N83-10953
VANDERVAART, J. C. N83-10053
VANDEVENDER, W. H. N83-10841
VANDREUMEL, W. H. M. N83-10122
VANGOOL, M. F. C. N83-10061
VANHEEK, K. H. N83-10143
N83-10616
VANLOON, L. S. N83-10650
VARGO, S. L. N83-10757
VASILAKIS, A. D. N83-10290
VASLOW, D. N83-10908
VATSA, V. N. N83-10018
VATSKY, A. N83-10568
VECCHIA, P. N83-10969
VENIER, C. G. N83-10575
VENKATRAMAN, S. S. N83-10193
VERMA, R. K. N83-10724
VERMEULEN, P. E. J. N83-10402
VOGT, W. G. N83-10594
VOLKOV, R. E. N83-10163
VOLKWEIN, J. C. N83-10492
VOLLAN, A. N83-10624
VONZWECK, O. H. N83-10737
VOORHEES, C. N83-10236
VORWERK, M. N83-10495
VREEDE, F. A. N83-10443
VUIL, H. A. N83-10452
VUONO, M. N83-10729

W

WADA, C. N83-10002
WAGONER, J. L. N83-10693
WALENZIK, C. N83-10145
WALKER, H. E. N83-10903
WALKER, J. A. N83-10582
WALKER, R. N83-10309
WALLA, P. S. N83-10348
WALLINGFORD, J. N83-10660
WALSH, J. J. N83-10594
WALSH, P. J. N83-10751
WALTEMEYER, S. D. N83-10488
WALTON, E. L. N83-10841
WANG, B. P. N83-10259
WANG, D. P. N83-10748
WANG, H. N83-10004
WANG, L. K. N83-10653
WANG, S. T. N83-10879
WANG, W. Y. N83-10206
WANKA, K. N83-10377
WARD, L. R. N83-10042
WARE, R. E. N83-10412
WARNER, M. N83-10202
WASHOM, B. N83-10540
N83-10550
WATSON, G. S. N83-10871
N83-10872
WATSON, R. W. N83-10794
WEBER, C. R. N83-10342
WEBER, P. G. N83-10421
WEBER, S. L. N83-10156
WEBSTER, B. D. N83-10736
WEEKS, S. J. N83-10199
WEGNER, M. N83-10618
WEIDNER, V. R. N83-10909
WEIMANN, A. N83-10377
WEINBERG, I. N83-10962
WEISE, M. R. N83-10562
WEIZER, V. G. N83-10554
WELSH, J. H. N83-10481
WELTE, D. N83-10624
WEN, G. N83-10006
WERSHAW, R. L. N83-10158
WESSOL, D. E. N83-10958
WEST, J. N83-10768
WEWERINKE, P. H. N83-10785
WHALEN, C. T. N83-10484
WHEELOCK, T. D. N83-10577
WHIPPLE, D. W. N83-10503
WHITE, A. L. N83-10583
WHITE, D. J. N83-10560
WHITE, J. M. N83-10139
WHITE, M. A. N83-10561
WHITE, R. M. N83-10306
WHITFORD, L. N83-10261
WHITLATCH, R. B. N83-10659
WHITNEY, R. A. N83-10699
WHITT, J. B. N83-10245
WHOL, C. G. N83-10895
WICKENS, C. D. N83-10778
WIELAND, R. M. N83-10807
N83-10957
WIESNER, B. N83-10618
WIGHTMAN, J. P. N83-10174
N83-10196
WILBURN, N. P. N83-10830
WILBY, W. A. N83-10020
WILDING, R. N83-10236
WILGEN, J. B. N83-10949
WILHELM, K. N83-10064
WILL, J. A. N83-10763
WILLIAMS, E. N83-10130
WILLIAMS, M. S. N83-10442
WILSON, C. L. N83-10376
WILSON, D. G. N83-10395
WILSON, J. D. N83-10412
WILSON, L. N83-10173
WILSON, M. R. N83-10334
WIMMEL, H. K. N83-10914
WINGENBACH, W. N83-10536
WINKELMANN, D. N83-10410
WINTERMUTE, G. E. N83-10119
WINTUCKY, E. G. N83-10117
WITTWER, V. N83-10621
WOLF, J. N83-10998
WOLF, M. N83-10517
WOLFF, F. H. N83-10255
N83-10268
WOLFF, J. J. N83-10698
WOLTORNIST, W. N83-10265
WOOD, D. N83-10549
WOODCOCK, R. J. N83-10055
WOODLEY, W. L. N83-10727
N83-10730
WOOLLETT, R. R. N83-10019
WOOLSEY, J. P. N83-10215
WOTRUBA, G. N83-10796
N83-10797
WRIGGE, S. N83-10862
WRIGHTON, F. N83-10638
WROBLEWSKI, K. A. N83-10027
WU, J. J. N83-10262
WU, K. T. N83-10328
WU, Y. N83-10445
WU, Y. Y. N83-10081
WULFF, P. N83-10628

X

XUE, D. N83-10014

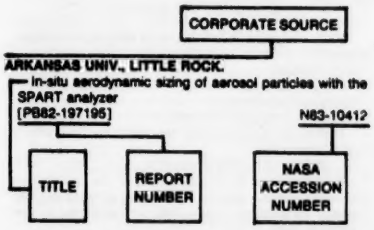
Y

YAKUTIS, A. J. N83-10098
YAMAGUCHI, N. N83-10916
YEN, J. T. N83-10601
YEN, P. H. N83-10161
YING, L. N83-10120
YOUNG, L. L., III N83-10772
YOUNG, R. C. N83-10831
YU, J. N83-10008
YU, Y. H. N83-10378
YUAN, Q. N83-10015
YUANJIAN, Y. N83-10099
YURA, J. A. N83-10292

Z

ZASTROW, A. N83-10621
ZEDLER, J. B. N83-10655
ZEGNA, A. N83-10649
ZEGNA, A. I. N83-10764
ZEWEN, H. N83-10541
ZHANG, G. N83-10005
N83-10008
ZHANG, J. N83-10009
ZHANG, W. N83-10010
ZHANG, Y. N83-10004
N83-10012
ZHANGWEI, H. N83-10381
ZIMMERMAN, D. K. N83-10529
ZIMMERMAN, W. N83-10431
ZOTKIN, I. T. N83-11006
ZWILLENBERG, M. L. N83-10590

Typical Corporate Source Index Listing



Listings in this index are arranged alphabetically by corporate source. The title of the document provides the user with a brief description of the subject matter. The report number helps to indicate the type of document cited (e.g., NASA report, translation, NASA contractor report). The NASA accession number denotes the number by which the citation is identified. The titles are arranged under each corporate source in ascending accession number order.

A

ABK-A JOINT VENTURE, EL SEGUNDO, CALIF.
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Diaphragm testing [PB82-213679] N83-10274
Methodology for mitigation of seismic hazards in existing unreinforced masonry buildings: Wall testing, out-of-plane [PB82-213687] N83-10281

ACUREX CORP., MOUNTAIN VIEW, CALIF.
Acurex Parabolic Dish Concentrator (PDC-2) N83-10527

ADVANCO CORP., EL SEGUNDO, CALIF.
Dish Stirling system integration and test progress report N83-10539
Commercialization of parabolic dish systems N83-10540
Panel discussions: Industrial support sector requirements N83-10550

ADVANCED MECHANICAL TECHNOLOGY, INC., NEWTON, MASS.
High-efficiency commercial water heater development [PB82-217514] N83-10290

ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT, NEUILLY-SUR-SEINE (FRANCE).
Criteria for Handling Qualities of Military Aircraft [AGARD-CP-333] N83-10054

AEG-TELEFUNKEN, WEDEL (WEST GERMANY).
Reliability and safety of power systems [BMFT-FB-T-82-080] N83-10432

AERONAUTICAL RESEARCH LABS., MELBOURNE (AUSTRALIA).
The effect of water displacing corrosion preventives on stress corrosion cracking of aluminium alloy 7075-T651 [ARL-MAT-NOTE-132] N83-10173

AEROSPACE CORP., EL SEGUNDO, CALIF.
PV large systems project N83-10512

AIR FORCE FLIGHT TEST CENTER, EDWARDS AFB, CALIF.
Development of handling qualities testing in the 70's: A new direction N83-10077

AIR FORCE INST. OF TECH., WRIGHT-PATTERSON AFB, OHIO.
Feedback information and analysis for microprocessor controlled muscle stimulation [AD-A115532] N83-10767

AIR FORCE SYSTEMS COMMAND, WRIGHT-PATTERSON AFB, OHIO.
Acta Aeronautica et Astronautica Sinica [AD-A117465] N83-10003
Aerodynamic characteristics of maneuvering flaps N83-10004
Numerical calculation of lift, moment coefficient and dynamic stability derivative on sideslipping wings in unsteady supersonic flows N83-10005
Numerical computation of unsteady subsonic aerodynamic forces on wing-body-tail exposed to traveling gust N83-10006
Calculation of stress intensity factors with hybrid stress elements and isoparametric elements N83-10007
An attempt to derive a varying thickness plate element from hybrid displacement method N83-10008
On the vibration of fiber reinforced laminated plates N83-10009
A dynamic reducing iterative method for solving large generalized eigenvalue problems N83-10010
Statistical estimation of liquid propellent rocket engine parameters N83-10011
Numerical tests of three-dimensional flow in a transonic turbine N83-10012
The effect of the stator with unequal pitch cascades on the compressor blade vibration N83-10013
The simulation study on a redundant flight control system N83-10014
A rapidly recursive method for the B-splines N83-10015
Design of the leading edge of a delta wing [AD-A117469] N83-10036
An informal discussion concerning geosynchronous communication satellites [AD-A117546] N83-10099
Voltage breakdown of spark gaps in compressed gases [AD-A117467] N83-10359
Optimal design of multiple tube grain and their arrangement [AD-A117545] N83-10362
Heavy-duty hydraulic stamping press with stressed reinforced concrete frame [AD-A117470] N83-10427
The healing process with vertebral fracture, with special consideration of the question of traumatic spondylosis deformans. Part 1. Animal experiments [AD-A117464] N83-10765
Two landings [AD-A117466] N83-10783
Phase conjugate optics and its potential applications [AD-A117468] N83-10906

AIR FORCE WRIGHT AERONAUTICAL LABS., WRIGHT-PATTERSON AFB, OHIO.
Present status of flying qualities criteria for conventional aircraft N83-10055
On modeling viscoelastic behavior N83-10222
Vibration test level criteria for aircraft equipment N83-10240
Analysis of the effects of explosive fuel ignition on an aircraft noise suppressor system N83-10247
Aircraft response to operations on rapidly repaired battle damaged runways and taxiways N83-10270
Acoustic environment on the surface of a large-scale powered model of a vectored-engine-over-the-wing STOL configuration N83-10272

AIRESEARCH MFG. CO., LOS ANGELES, CALIF.
Application of the subatmospheric engine to solar thermal power N83-10546

AIRESEARCH MFG. CO., TORRANCE, CALIF.
Combinational logic for generating gate drive signals for phase control rectifiers [NASA-CASE-MFS-25208-1] N83-10345
A lightweight electronically commutated dc motor for electric passenger vehicles [NASA-CR-165601] N83-10348
High-temperature ceramic heat exchanger element for a solar thermal receiver N83-10543

AKRON UNIV., OHIO.
NASA LeRC/Akron University Graduate Cooperative Fellowship Program and Graduate Student Researchers Program [NASA-CR-167943] N83-10970

ALPHA OMEGA GROUP, INC., HARVARD, MASS.
Entity types and relationships (for a data dictionary system), phase 1 [PB82-200403] N83-10838

AMAF INDUSTRIES, COLUMBIA, MD.
Experimental investiation of neutral plasma beam propagation across a magnetic field [AD-A117765] N83-10927

AMBERGER KAOLINWERKE G.M.B.H., HIRSCHAU (WEST GERMANY).
Separation of a feldspar/quartz suspension in the particle range from 0.1 to 1.5/2.0 mm into feldspar and quartz by flotation [BMFT-FB-T-82-096] N83-10144

AMERICAN UNIV., WASHINGTON, D. C.
A principal components approach to some multivariate estimation problems with incomplete data N83-10868

ANAMET LABS., INC., SAN CARLOS, CALIF.
Finite element prediction of damping in beams with constrained viscoelastic layers N83-10223

APPLIED CONCEPTS CORP., RESTON, VA.
Verification testing of the PKI collector at Sandia National Laboratories, Albuquerque, New Mexico N83-10534
PKI solar thermal plant evaluation at Capitol Concrete Products, Topeka, Kansas N83-10535

APPLIED PHYSICS LAB., JOHNS HOPKINS UNIV., LAUREL, MD.
Geothermal energy development in the United States [PB82-215146] N83-10636
Ocean thermal energy at the Johns Hopkins University Applied Physics Laboratory [PB82-215054] N83-10639
Geothermal community heating for Cape Charles, Virginia [PB82-184003] N83-10640
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation [PB82-183997] N83-10643
Fault zones and seismicity in western Connecticut and southeastern New York [PB82-215641] N83-10710
Biomedical research, development and engineering at the Johns Hopkins University Applied Physics Laboratory [PB82-184029] N83-10774

APPLIED SOLAR ENERGY CORP., CITY OF INDUSTRY, CALIF.
Large-area silicon sheet task N83-10520

APPLIED TECHNOLOGY COUNCIL, BERKELEY, CALIF.
Seismic design guidelines for highway bridges [PB82-181611] N83-10301

ARGONNE NATIONAL LAB., ILL.
Dynamic response of the progressively damaging structures N83-10267
Proceedings of the US Department of Energy/Argonne National Laboratory Contractors' Research and Development Workshop: Converting Waste to Energy [DE82-014337] N83-10578
Sampling and detection of tagged dredged material [DE82-016056] N83-10650
Six language extensions to enhance the portability of mathematical software written in PL/I: Background and justification [DE82-017660] N83-10832
Demonstration Tokamak power plant study [DE82-016182] N83-10937
Wildcat: A catalyzed D-D Tokamak reactor [DE82-013712] N83-10938

ARIZONA UNIV., TUCSON.
Ultrasound spectroscopy N83-10884

ARKANSAS UNIV., LITTLE ROCK.
In-situ aerodynamic sizing of aerosol particles with the SPART analyzer [PB82-197195] N83-10412

ARMY AIR CORPS, STOCKBRIDGE (ENGLAND).
Operational criteria for the handling qualities of combat helicopters N83-10067

ARMY ARMAMENT RESEARCH AND DEVELOPMENT COMMAND, WATERVLIET, N. Y.
Vibrations of a beam under moving loads by a finite element formulation consistent in time and spatial coordinates N83-10262

ARMY AVIATION RESFARCH AND DEVELOPMENT COMMAND, CLEVELAND, OHIO.
Life and reliability models for helicopter transmissions [NASA-TM-82976] N83-10425

ARMY AVIATION RESEARCH AND DEVELOPMENT COMMAND, MOFFETT FIELD, CALIF.
Holographic interferometry technique for rotary wing aerodynamics and noise
[NASA-TM-84723] N83-10378
ARMY ENGINEER TOPOGRAPHIC LABS., FORT BELVOIR, VA.
Gravity vector determination from inertial and auxiliary data and potential utilization of generated vector component information
[AD-A116819] N83-10685
ARMY ENGINEER WATERWAYS EXPERIMENT STATION, VICKSBURG, MISS.
Development of a multiaxial force-pulse generator N83-10237
ARMY RESEARCH AND TECHNOLOGY LABS., MOFFETT FIELD, CALIF.
The status of military helicopter handling qualities criteria N83-10065
ARMY RESEARCH INST. FOR THE BEHAVIORAL AND SOCIAL SCIENCES, ALEXANDRIA, VA.
Maintaining motor skill performance
[AD-A117349] N83-10781
ARMY RESEARCH INST. OF ENVIRONMENTAL MEDICINE, NATICK, MASS.
Cardiorespiratory responses to varied exercise distributions between upper and lower body muscle groups
[AD-A115092] N83-10762
Risk taking as motivation for volunteering for a hazardous experiment
[AD-A115097] N83-10780
ARMY TEST AND EVALUATION COMMAND, ABERDEEN PROVING GROUND, MD.
Flight testing operations procedure
[AD-A116984] N83-10030
ASHLAND PETROLEUM CO., KY.
Refining of military jet fuels from shale oil. Part 1. Preliminary process design, economic and yield optimization, and computer modeling
[AD-A117511] N83-10210
ASSOCIATION OF INDIAN DROP FORCING AND STAMPING, BOMBAY.
Seminar on heat treatment and metallurgical quality control of forgings
[PB82-209438] N83-10184
ATKINSON-NOLAND AND ASSOCIATES, INC., BOULDER, COLO.
Investigation into methods of nondestructive evaluation of masonry structures
[PB82-216074] N83-10280
ATLANTIC RESEARCH CORP., ALEXANDRIA, VA.
Automatic audio signing. Volume 1: Executive summary
[PB82-202953] N83-10282
Automatic audio signing. Volume 2: Review, analysis and design
[PB82-202961] N83-10283
ATMOSPHERIC AND ENVIRONMENTAL RESEARCH, INC., CAMBRIDGE, MASS.
Io: Escape and ionization of atmospheric gases
[NASA-CR-169443] N83-11004
Other satellite atmospheres: Their nature and planetary interactions
[NASA-CR-169439] N83-11005
AUBURN UNIV., ALA.
Allocating R and D resources: A study of the determinants of R and D by character of use
[PB82-209800] N83-10975
AVIONS MARCEL DASSAULT-BREGUET AVIATION, SAINT-CLOUD (FRANCE).
Fly by wire control: Towards new norms for judging flight qualities. An example: The Mirage 2000 N83-10060

B

BALLISTIC RESEARCH LABS., ABERDEEN PROVING GROUND, MD.
A new type of EM wave absorbing coating
[AD-A117472] N83-10333
BARBER-NICHOLS ENGINEERING CO., ARVADA, COLO.
Organic Rankine power conversion subsystem development for the small community solar thermal power system N83-10533
BATTELLE COLUMBUS LABS., OHIO.
Potential effect of ferrous scrap composition on the quality of iron and steel coatings
[PB82-194184] N83-10180
BATTELLE INST., FRANKFURT AM MAIN (WEST GERMANY).
Research and development on a MIS thin film solar cell made of amorphous silicon
[BMFT-FB-T-82-079] N83-10620
BATTELLE MEMORIAL INST., COLUMBUS, OHIO.
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
BATTELLE PACIFIC NORTHWEST LABS., RICHLAND, WASH.
Kinetics and catalysis of producing synthetic gases from biomass
[PB82-214347] N83-10156
BENDIX CORP., KANSAS CITY, MO.
RF characterization of semiconductors
[DE82-016995] N83-10335
BERGBAU A.G. LIPPE (WEST GERMANY).
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617
BERGBAU-FORSCHUNG G.M.B.H., ESSEN (WEST GERMANY).
Coal gasification of steam-soluted catalyst
[BMFT-FB-T-82-073] N83-10143
Steam gasification of coal, project prototype plant nuclear process heat: Report at the end of the reference phase
[BMFT-FB-T-82-069] N83-10616
BERGWERK NORDSTERN (WEST GERMANY).
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617
BOEING CO., SEATTLE, WASH.
Necessary and sufficient qualification for shock N83-10220
BOEING COMMERCIAL AIRPLANE CO., SEATTLE, WASH.
Service evaluation of Aluminum-Brazed Titanium (ABTi) jet engine tailpipe extensions
[NASA-CR-3617] N83-10172
BOEING COMPUTER SERVICES, INC., SEATTLE, WASH.
Intermediate photovoltaic system application experiment operational performance report. Volume 7: Beverly High School, Beverly, Mass.
[DE82-015790] N83-10607
Intermediate photovoltaic system application experiment operational performance. Volume 6 for Lovington Square Shopping Center, Lovington, NM
[DE82-015476] N83-10608
BOEING ENGINEERING AND CONSTRUCTION, SEATTLE, WASH.
Thin film concentrator panel development N83-10529
BONN UNIV. (WEST GERMANY).
Photon induced reactions
[BONN-HE-82-7] N83-10899
BOSCH (ROBERT) G.M.B.H., STUTTGART (WEST GERMANY).
Investigation of the behavior of noise-sensitive electronic circuits for automotive applications with particular attention to MOS circuits
[PB82-211392] N83-10372
BOSTON COLL., CHESTNUT HILL, MASS.
Singular perturbation aspects of kinetic equations N83-10913
BRITISH AEROSPACE PUBLIC LTD. CO., PRESTON (ENGLAND).
Piloted handling qualities design criteria for high order flight control systems N83-10058
Experience of non-linear high incidence aerodynamic characteristics N83-10070
BRITISH BROADCASTING CORP., KINGSWOOD (ENGLAND).
High quality decoding for PAL inputs to digital YUV studios
[BBC-RD-1982/12] N83-10308
The design of a new wideband modular sound absorber
[BBC-RD-1982/8] N83-10309
Balancing artificial reverberation for television stereophony
[BBC-RD-1982/9] N83-10310
Rank order difference analysis applied to tests of the television consistency index
[BBC-RD-1982/10] N83-10311
A fibre-optic link for television outside broadcasts
[BBC-RD-1982/11] N83-10312
Radio-frequency ignition hazards: The choice of reference aerial for available-power calculations
[BBC-RD-1982/16] N83-10313
L.F./M.F. radio data: compatibility tests
[BBC-RD-1982/15] N83-10314
BRITISH LIBRARY LENDING DIV., BOSTON SPA (ENGLAND).
Donor-acceptor complex chromatography. Tetrachlorophathalimidopropyl silica, a new bonded stationary phase for separation of coal liquefaction products and other aromatic mixtures by HPLC
[BLL-BG/MRS14580/82-(9022.048)] N83-10127
Investigating the possibility of combustion of a mass of sponge iron
[M26521] N83-10128
Development and application of austenitic cast iron containing spherical graphite for the mechanical structure of a fusion reactor
[BLL-CTO-2075-(9091.9F)] N83-10162
The nucleation and forming of non-metallic inclusions in the crystallization of an ingot
[BLL-M26518] N83-10163
The removal of non-metallic inclusions from steel
[BLL-M26519] N83-10164
An investigation on a model of the slag-metal transition zone
[BLL-M26523] N83-10165
Programme system GANESI. Documentation report 1: Operating instructions
[BLL-T5870/BGLRS/T586(9022.048)] N83-10377
High-frequency ultrasonics: Non-destructive analysis of material structures
[BLL-RISLEY-TR-4166F-(9091.9F)] N83-10431
Experiments on the ADAM 1 plant for the optimisation of methanization process in the long distance nuclear energy transmission system test run performed in the spring of 1980
[BLL-T5869/BG/MRS14614/82] N83-10495
BROWN UNIV., PROVIDENCE, R. I.
An investigation of interfacial reactions in metal matrix composites
[AD-A117741] N83-10176
BRUNEL UNIV., UXBRIDGE (ENGLAND).
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
BUNDESAMT FUER WEHRTECHNIK UND BESCHAFFUNG, MUNICH (WEST GERMANY).
Experience with System Identification From Tracking (SIFT) flight-test-techniques at the German Air Force Flight Test Center N83-10078
BUREAU OF MINES, ALBANY, OREG.
Electrochemical determination of Gibbs energies of formation of cobalt and nickel sulfides
[PB82-177304] N83-10159
Analysis of vapor aluminum diffused stainless steels
[PB82-202268] N83-10185
BUREAU OF MINES, AVONDALE, MD.
Effect of ferric ion on corrosion resistance of zirconium in HC1-A1C3 environment
[PB82-194895] N83-10187
Electrochemical studies of platinum-group metals in molten alkali metal cyanides
[PB82-202243] N83-10190
BUREAU OF MINES, ANCHORAGE, ALASKA.
Critical and strategic minerals in Alaska: Cobalt, the platinum-group metals and chromite
[PB82-193065] N83-10485
BUREAU OF MINES, BOULDER CITY, NEV.
Aluminum chloride hexahydrate crystallization by HC1 gas sparging
[PB82-177353] N83-10191
BUREAU OF MINES, DENVER, COLO.
Electromagnetic radiation from rock failure
[PB82-177338] N83-10493
BUREAU OF MINES, MINNEAPOLIS, MINN.
High-temperature corrosion resistance of basic refractories to coal and lignite ash slags
[PB82-201351] N83-10186
BUREAU OF MINES, PITTSBURGH, PA.
Computerized, remote monitoring systems for underground coal mines: Fires and explosive atmospheres
[PB82-221359] N83-10481
Canopy-air curtain dust reductions on a gathering-arm loader
[PB82-177791] N83-10492
BUREAU OF MINES, RENO, NEV.
Recovery of metal values from lead smelter matte by chlorine-oxygen leaching
[PB82-194903] N83-10188
Improvements in heap leaching to recover silver and gold from low-grade resources
[PB82-193434] N83-10189
BUREAU OF MINES, SALT LAKE CITY, UTAH.
Orifice plate design studies for a multiple-compartment, ion-exchange column
[PB82-201310] N83-10155

C

CALIFORNIA INST. OF TECH., PASADENA.
Studies of chemical adsorption using low energy electron diffraction N83-10130
Unsteady 2-phase flow instrumentation and measurement N83-10406

Finite plane and anti-plane elastostatic fields with discontinuous deformation gradients near the tip of a crack N83-10446
The luminescent solar concentrator N83-10902
Measurements of magnetic field fluctuations in the Caltech research Tokamak N83-10925
Low temperature photoluminescence studies of shallow electronic states in semiconductors N83-10959
Energetic oxygen and sulfur ions in the Jovian magnetosphere N83-11003

CALIFORNIA UNIV., BERKELEY. LAWRENCE BERKELEY LAB.
Photoelectron spectroscopy of supersonic molecular beams
[DE82-016940] N83-10892
Some calculator programs for particle physics
[DE82-012362] N83-10895
Accelerator and fusion research division
[DE82-012361] N83-10930
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
Comparative performance evaluation of database management systems
[DE82-010165] N83-10983

CALIFORNIA UNIV., DAVIS.
Turbulent transport modelling of separating and reattaching shear flows
[NASA-CR-169368] N83-10380

CALIFORNIA UNIV., IRVINE.
Development of meteorological scenarios for air quality planning using multivariate statistical analysis of meteorological and air quality data N83-10644
Plasma physics aspects of the solar neutrino problem N83-10912

CALIFORNIA UNIV., LIVERMORE. LAWRENCE LIVERMORE LAB.
Spectral response functions of large-diameter tubular xenon flashlamps at different times
[DE82-010641] N83-10363
Hydrologic test system for fracture flow studies in crystalline rock
[DE82-016361] N83-10477
Cross-borehole fracture mapping using electromagnetic geotomography
[DE82-015648] N83-10691
Aerial geologic log from Livermore, California to the Nevada Test Site, Nye County, Nevada
[DE82-018392] N83-10693
Geology of the Southeastern Livermore Valley, Alameda County, California
[DE82-012496] N83-10697
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
Earthquake strong-motion instrumentation at Lawrence Livermore National Laboratory
[DE82-012493] N83-10700
Overview of the LINCS architecture
[DE82-010600] N83-10794
FORIG: A modification of the ORIGEN2 isotope-generation and depletion code for fusion problems
[DE82-016133] N83-10819
ORION: An interactive post-processor for the analysis codes NIKE2D, DYNA2D, and TACO2D
[DE82-010710] N83-10822
Software tools and more for Modcomp computers
[DE82-007985] N83-10823
Powerful tool for design analysis of linear control systems
[DE82-015141] N83-10851
Stop: A fast procedure for the exact computation of the performance of complex probabilistic systems
[DE82-007990] N83-10869
Stability and disturbance of large dc superconducting magnets
[DE82-012368] N83-10879
Word processing/office information systems: Managers perspective, a management tool
[DE82-016000] N83-10984
Energy and Technology Review, March 1982
[DE82-012426] N83-11015
Measuring the microtopography of optical surfaces N83-11016
Composite-material flywheels and containment systems N83-11017

CALIFORNIA UNIV., LOS ANGELES.
A logical database design framework
[PB82-203316] N83-10986

CALIFORNIA UNIV., SAN DIEGO.
Kinetic theory of tearing modes N83-10911

CALSPAN ADVANCED TECHNOLOGY CENTER, BUFFALO, N.Y.
Effect of control system delays on fighter flying qualities N83-10072
Simulation for predicting flying qualities N83-10080

CAMBRIDGE UNIV. (ENGLAND).
Reduction of aerodynamic drag: Torsion disc viscometry
[AD-A117859] N83-10020

CAMEA S.A., BUENOS AIRES (ARGENTINA).
A fracture mechanism map for pure iron
[PB82-189150] N83-10454

CANADA INST. FOR SCIENTIFIC AND TECHNICAL INFORMATION, OTTAWA (ONTARIO).
Use of organofluorine compounds
[NRC/CNR-TT-2027] N83-10115

CARNEGIE-MELLON UNIV., PITTSBURGH, PA.
Studies on the thermodynamic, rheological and rheo-optical properties of a rigid rod polymer in solution N83-10193
Tricritical points and ising models on a hierarchical lattice N83-10961

CELANESE CORP. OF AMERICA, SUMMIT, N.J.
Effects of fiber/matrix interactions on the properties of graphite/epoxy composites
[NASA-CR-3607] N83-10120

CENTRE NATIONAL D'ETUDES SPATIALES, TOULOUSE (FRANCE).
Performance-cost analysis of a large program: The case of Ariane
[CNES-NT-103] N83-10100

CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, MARSEILLES (FRANCE).
The French thermo-helio-electricity-KW parabolic dish program N83-10542
Geometrical remarks in statistical mechanics. 1: The duality transformation on a lattice with an Abelian group as configuration space
[DE82-903181] N83-10874

CENTRE TECHNIQUE DES INDUSTRIES MECANIQUES, ST. ETIENNE (FRANCE).
Forming techniques and procedures
[PB82-289002] N83-10298

CHALMERS UNIV. OF TECHNOLOGY, GOTEBORG (SWEDEN).
Rain fall data for the design of sewer pipe systems
[PB82-187212] N83-10299
On scattering and everywhere defined scattering operators for nonlinear Klein-Gordon equations
[CTH-MATH-1982-09] N83-10859
On the maximal function for the Mehler kernel
[CTH-MATH-1982-8] N83-10860
Arithmetical quadratic surfaces of Genus 0, 2
[CTH-MATH-1982-10] N83-10861

CINCINNATI UNIV., OHIO.
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 3: Program documentation
[PB82-187857] N83-10413
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 2: User's guide
[PB82-187840] N83-10414
The standard calibration instrument automation system for the atomic absorption spectrophotometer. Part 1: Functional specifications
[PB81-187832] N83-10415

CITY COLL. OF THE CITY UNIV. OF NEW YORK.
Modulation techniques
[NASA-CR-169460] N83-10329
Acquisition, image and data compression
[AD-A117737] N83-10904

CITY UNIV. OF NEW YORK, N. Y.
The heat capacity of coal chars N83-10206
Synchronization, bandwidth occupancy and effects of transmission errors in digital communication system N83-10316
A modified adaptive delta modulator for video data compression N83-10317
Carrier transport in amorphous silicon utilizing picosecond photoconductivity N83-10960

CLARKSON COLL. OF TECHNOLOGY, POTSDAM, N.Y.
Nonlinear analysis of beams. Part 1: A Survey of recent advances N83-10436

CLEMSON UNIV., S.C.
Fracture and crack growth in orthotropic laminates. Part 1: Analysis of a hybrid, unidirectional laminate with damage
[NASA-CR-169461] N83-10448
Fracture and crack growth in orthotropic laminates. Part 2: Experimental determination of internal damage growth in unidirectional boron/aluminum composite laminates
[NASA-CR-169462] N83-10449

COLORADO SCHOOL OF MINES, GOLDEN.
Liquid-vapor equilibrium for ternary natural gas system
[PB82-227679] N83-10160
Geophysical detection of groundwater
[AD-A117277] N83-10474

COLUMBIA UNIV., NEW YORK.
Recent research on noise transmission into aircraft N83-10435
Membrane controlled anaerobic digestion N83-10497
Contributions to reduced order control theory N83-10846
Production and experimental study of the dissipative trapped ion instability N83-10910
Observations of plasma rotation in the high-beta Tokamak Torus 2
[DE82-019373] N83-10952

COMBUSTION POWER CO., INC., MENLO PARK, CALIF.
Development of a solid waste fired fluidized boiler, phase 1 N83-10562

COMMITTEE OF CONFERENCE (U. S. CONGRESS).
Making appropriations for the Department of Housing and Urban Development, and for sundry independent agencies, boards, commissions, corporations, and offices
[H-REPT-97-891] N83-10988
National Aeronautics and Space Administration N83-10989

COMMITTEE ON SCIENCE AND TECHNOLOGY (U. S. HOUSE).
Flight of STS-4 with astronauts Captain T. Ken Mattingly and Henry Hartsfield
[GPO-97-828] N83-10107

COMPTROLLER GENERAL OF THE UNITED STATES, WASHINGTON, D.C.
DOD's use of remotely piloted vehicle technology offers opportunities for saving lives and dollars
[MASAD-81-20] N83-10875

COMPUTER SCIENCES CORP., HAMPTON, VA.
NECAP 4.1: NASA's Energy Cost Analysis Program thermal response factor routine
[NASA-CR-165982] N83-10562

CONCORDIA UNIV., MONTREAL (QUEBEC).
Dynamic behavior of lathe spindles with elastic supports including damping by finite element analysis N83-10224
Pneumatic vibration control using active force generators N83-10226
Effect of stiffener arrangement on the random response of a flat panel N83-10260

CONNECTICUT UNIV., NOANK.
The ecology of New England tidal flats: A community profile
[PB82-217100] N83-10659

CONNECTICUT UNIV., STORRS.
Development and experimental evaluation of a steel tube vehicle impact attenuation system
[PB82-182684] N83-10300

CORNELL UNIV., ITHACA, N. Y.
Studies related to the deep earth gas
[PB82-227653] N83-10213
Large-area silicon sheet task N83-10520
Magnetoelastic instabilities and vibrations of superconducting-magnet systems
[DE82-015206] N83-10880

CORNELL UNIV., NEW YORK.
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755

COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH, PRETORIA (SOUTH AFRICA).
Measuring plane states of stress with regular strain gauge rosettes
[CSIR-ME-1731] N83-10443
Comparative system model validation using four optimization algorithms
[NIAST-81/124] N83-10877

CRYSTACOMM, INC., MOUNTAIN VIEW, CALIF.
Investigation of large diameter polycrystalline crucible shaped InP
[AD-A117739] N83-10137

D

DAVIS ENERGY GROUP, CALIF.
Feasibility study of geothermal heating, Modoc Lassen housing project
[DE82-015099] N83-10611

DAYTON UNIV., OHIO.
Finite element analysis of viscoelastically damped sandwich structures N83-10225
On nonlinear response of multiple blade systems N83-10261
A preprocessor system for finite element analysis
[AD-A117544] N83-10810

DEFENCE RESEARCH INFORMATION CENTRE, ORPINGTON (ENGLAND).
Features of the structure of large forge ingots made from steel with different impurity content
[DRIC-T-6708] N83-10175
The metal-ceramic X-ray tube
[DRIC-T-6676] N83-10357
The endangering of mankind by microwaves and radio waves
[DRIC-T-6709] N83-10761
DEFENSE INDUSTRIAL SUPPLY CENTER, PHILADELPHIA, PA.
Department of Defense policy on reliability and maintainability N83-10219
DEFENSE MAPPING AGENCY AEROSPACE CENTER, ST. LOUIS, MO.
Standardization of map symbology
[AD-A117530] N83-10475
DEPARTMENT OF AGRICULTURE, MADISON, WIS.
A method for determining the effect of transportation vibration on unitized corrugated containers N83-10271
DEPARTMENT OF AGRICULTURE, WASHINGTON, D.C.
Estimated capacity of US ethanol plants
[PB82-203647] N83-10154
DEPARTMENT OF ENERGY, WASHINGTON, D. C.
National photovoltaic program N83-10506
Technology spin-offs from the magnetic fusion energy program
[DE82-016923] N83-10897
Report of the subpanel on long-range planning for the US High-Energy-Physics Program of the High-Energy-Physics Advisory Panel
[DE82-012502] N83-10898
DEPUTY CHIEF OF STAFF FOR RESEARCH DEVELOPMENT AND ACQUISITION (ARMY), WASHINGTON, D.C.
Bioeffects data concerning the safe use of GaAs laser training devices
[AD-A117810] N83-10766
DESMATICS, INC., STATE COLLEGE, PA.
Factors screening in simulation: Evaluation of a random balance/Plackett-Burman strategy
[AD-A117529] N83-10809
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, BRUNSWICK (WEST GERMANY).
Techniques for air traffic planning and handling in the terminal area
[DFVLR-MITT-82-04] N83-10032
Handling qualities aspects of CTOL aircraft with advanced flight controls N83-10064
DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT, COLOGNE (WEST GERMANY).
Interpretation of subcritical crack growth in ceramic materials
[DFVLR-FB-82-07] N83-10198
DORNIER-WERKE G.M.B.H., FRIEDRICHSHAFEN (WEST GERMANY).
Handling qualities criteria for longitudinal control N83-10062
Development of a 5.5 m diameter vertical axis wind turbine, phase 3
[BMFT-FB-T-82-086] N83-10624
DRAPER (CHARLES STARK) LAB., INC., CAMBRIDGE, MASS.
Active Control of Space Structures (ACOSS) Eleven
[AD-A117596] N83-10111
ACOSS eleven (Active Control of Space Structures), volume 1
[AD-A117595] N83-10112

E

E-SYSTEMS, INC., DALLAS, TEX.
A transmittance-optimized point-focus Fresnel lens solar concentrator N83-10530
EARTHQUAKE ENGINEERING RESEARCH INST., BERKELEY, CALIF.
Shaking table tests of a tubular steel frame model
[PB82-220161] N83-10277
DELIGHT.STRUCT: A computer-aided design environment for structural engineering
[PB82-218496] N83-10276
Optimal design of seismic resistant planar steel frames
[PB82-220179] N83-10279
Dynamic behavior of ground for seismic analysis of lifeline systems
[PB82-218926] N83-10287
EDGERTON, GERMESHAUSEN AND GRIER, INC., IDAHO FALLS, IDAHO.
Health effects of welding fumes and gases
[DE82-012199] N83-10771
Identification of multivariate linear systems
[DE82-015201] N83-10873
Methods to enhance blanket power density
[DE82-017467] N83-10958
EMORY UNIV., ATLANTA, GA.
Cardiovascular adaptations during long-term altered gravity
[NASA-CR-169438] N83-10750
ENGINEERING DEVELOPMENT ESTABLISHMENT, MARIBYRNONG (AUSTRALIA).
Investigation of the performance of a Ford 4.1 L 6 cylinder SI engine operating on methonol iso-butanol gasoline fuel blends
[AD-A117746] N83-10426
ENGINEERING-SCIENCE, INC., ARCADIA, CALIF.
Research, development and demonstration in the design of sanitary landfill to optimize the generation and capture of compressible gas N83-10595
ENGINEERS TESTING LABS., INC., PHOENIX, ARIZ.
Sulfate resistance of mortars using fly ash as a partial replacement for Portland cement
[PB82-208810] N83-10305
ENGINS MATRA, VELIZY (FRANCE).
Automatic Repeat Query (ARQ), Forward Error Corrector (FEC), and hybrid protection systems
[DM51/BR-JP/0598-82] N83-10339
ENVIRO CONTROL, INC., ROCKVILLE, MD.
Proceedings of the conference on energy conservation: Retrofit of Municipal Wastewater Treatment Facilities
[DE82-013710] N83-10612
ENVIRONMENTAL PROTECTION AGENCY, ANN ARBOR, MICH.
Determination of a range of concern for mobile source emissions of hydrogen sulfide
[PB82-201773] N83-10663
ENVIRONMENTAL PROTECTION AGENCY, RESEARCH TRIANGLE PARK, N.C.
Compilation of air pollutant emission factors, supplement 12
[PB82-184722] N83-10654
Fugitive emission sources of organic compounds: Additional information on emissions, emission reductions, and costs
[PB82-217126] N83-10657
Review of the national ambient air quality standards for particulate matter: Assessment of scientific and technical information
[PB82-177874] N83-10670
ENVIRONMENTAL RESEARCH AND TECHNOLOGY, INC., CONCORD, MASS.
TIROS-N series direct readout services users guide
[PB82-219023] N83-10728
ENVIRONMENTAL RESEARCH INST. OF MICHIGAN, ANN ARBOR.
Radiance calculations for optimization of sensors designed for remote bathymetry, volume 1
[AD-A117743] N83-10739
ENVIRONMENTAL SCIENCES RESEARCH LAB., RESEARCH TRIANGLE PARK, N.C.
Meteorology and air quality modeling in complex terrain: A literature review
[PB82-200247] N83-10673
EUROSIL G.M.B.H., ECHING (WEST GERMANY).
Development of an eight-bit microprocessor component family in CMOS technology
[BMFT-FB-T-82-089] N83-10796
Development of a single chip microprocessor in CMOS silicon gate technology. Further development of four bit microprocessor concept in CMOS technology
[BMFT-FB-T-82-088] N83-10797

F

FACHHOCHSCHULE, GIESSEN (WEST GERMANY).
Measurement studies of a 15 kW wind power plant
[BMFT-FB-T-82-109] N83-10633
FEDERAL AVIATION ADMINISTRATION, ATLANTIC CITY, N.J.
Light aircraft piston engine carburetor ice detector/warning device sensitivity/effectiveness
[AD-A117745] N83-10041
FEDERAL AVIATION ADMINISTRATION, WASHINGTON, D.C.
Direct aircraft velocity determination by L-band moving target detector radar
[AD-A117512] N83-10031
FEDERAL COMMUNICATIONS COMMISSION, WASHINGTON, D. C.
AM receiver performance for 10 kHz signal spacings
[PB82-192576] N83-10342
Comparability for UHF television
[PB82-218710] N83-10344
FEDERAL COMPILER TESTING CENTER, FALLS CHURCH, VA.
Gould concept 32/87 FORTRAN 77+ release 3.0
[PB82-182700] N83-10792
Validation summary report NCR Corporation V8570 VRX COBOL 30
[PB82-185554] N83-10798
A functional specification of the relational DBMS. I: Mandatory functions only
[PB82-182965] N83-10799
Gould concept 32/87, COBOLT release 1.2
[PB82-182486] N83-10800
Gould concept 32/87, COBOL release 1.2
[PB82-182494] N83-10801
Burroughs Corporation large systems COBOL 74
[PB82-185547] N83-10844
FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING AND TECHNOLOGY, WASHINGTON, D. C.
National Marine Pollution Program Plan. Federal plan for ocean pollution research, development and monitoring. Fiscal years, 1981 - 1985
[PB82-218462] N83-10656
FEDERAL HIGHWAY ADMINISTRATION, WASHINGTON, D.C.
Aggregate microtexture: Profile measurement and related frictional levels
[PB82-202565] N83-10124
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293
FELTEN AND GUILLEAUME CARLSWERK A.G., COLOGNE (WEST GERMANY).
Telecommunication in power systems using optical fibre cells
[BMFT-FB-T-82-082] N83-10336
FERNMELDETECHNISCHES ZENTRALAMT, DARMSTADT (WEST GERMANY).
A method for the optimization of linear band-limited transmission channels for digital transmission in the base band
[FTZ-444-TBR-9] N83-10337
FIELD (RALPH M.) AND ASSOCIATES, WESTPORT, MASS.
State and local acquisition of floodplains and wetlands: A handbook on the use of acquisition in floodplain management
[PB82-284805] N83-10664
FLORIDA STATE UNIV., TALLAHASSEE.
Large deviation local limit theorems for arbitrary sequences of random variables
[AD-A117513] N83-10870
FLORIDA UNIV., GAINESVILLE.
The Tricky-Fix signal processor N83-10347
Methods for investigating the properties of polycrystalline silicon p-n junction solar cells N83-10565
Studies of growth-in defects and transport properties versus growth parameters in III-V compound semiconductors
[AD-A117871] N83-10966
FLOW RESEARCH, INC., KENT, WASH.
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
FOOD AND DRUG ADMINISTRATION, WASHINGTON, D. C.
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153
FORD AEROSPACE AND COMMUNICATIONS CORP., NEWPORT BEACH, CALIF.
Development status of the small community solar power system N83-10532
FORSCHUNGSSTELLE FUER ENERGIEWIRTSCHAFT, MUNICH (WEST GERMANY).
Study of the possibilities of more rational use of energy in the sector of trade and commerce, part 1
[BMFT-FB-T-82-076-PT-1] N83-10618
FOSTER-MILLER ASSOCIATES, INC., WALTHAM, MASS.
Evaluation of the Kloswall longwall mining system
[DE82-015881] N83-10606
FOUNDATION SCIENCES, INC., PORTLAND, OREG.
Laboratory rock mechanics testing manual
[DE82-015763] N83-10702
FRAUNHOFER-INST. FUER ANGEWANDTE FESTKOERPERPHYSIK, FREIBURG (WEST GERMANY).
Solar energy conversion based on the principe of fluorescent collectors
[BMFT-FB-T-82-081] N83-10621
FRIEDRICHS (THEODOR) UND CO., SCHENEFELD (WEST GERMANY).
Simple anemometer for wind classification
[BMFT-FB-T-82-106] N83-10719

FRIEDRICHSFELD G.M.B.H., MANNHEIM (WEST GERMANY).
Production technology of an electrolyte for Na/S batteries
[BMFT-FB-T-82-065] N83-10614
FRUEHAUF CORP., DETROIT, MICH.
Shock, vibration and fatigue in transportation industries N83-10233

G

GARRETT TURBINE ENGINE CO., PHOENIX, ARIZ.
Garrett solar Brayton engine/generator status N83-10545
GAS RESEARCH INST., CHICAGO, ILL.
Symposia on Pulse-Combustion Applications and Condensing Heat Exchangers
[PB82-184086] N83-10641
GENERAL ATOMIC CO., SAN DIEGO, CALIF.
Application of a floating point systems AP190L array processor to finite element analysis
[DE82-015239] N83-10831
The Doublet III Thomson-scattering-system hemiconcentric triplet lens
[DE82-017384] N83-10908
GENERAL ELECTRIC CO., PHILADELPHIA, PA.
Design and development of a high-concentration photovoltaic concentrator
[DE82-015673] N83-10597
Technology needs assessment of an atmospheric observation system for tropospheric research missions, part 1
[NASA-CR-3556] N83-10645
Technology needs assessment of an atmospheric observation system for multidisciplinary air quality/meteorology missions, part 2
[NASA-CR-3557] N83-10646
GENERAL ELECTRIC CO., SCHENECTADY, N. Y.
Improved transistorized AC motor controller for battery powered urban electric passenger vehicles
[NASA-CR-167978] N83-10349
Phototransistor switch for breaker applications
[DE82-904374] N83-10367
GENERAL ELECTRIC CO., UTICA, N. Y.
Fatigue life prediction for simultaneous stress and strength variances under random vibration N83-10266
GENERAL MOTORS CORP., INDIANAPOLIS, IND.
Life Utilization Criteria Identification in Design (LUCID)
[AD-A117807] N83-10046
GEO-CENTERS, INC., NEWTON, MASS.
A review of three-dimensional vision for robotics
[AD-A118055] N83-10850
GEOLOGICAL SURVEY, ALBANY, N.Y.
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720
GEOLOGICAL SURVEY, DENVER, COLO.
Reconnaissance samplings and characterization of aquatic humic substances at the Yuma Desalting Test Facility, Arizona
[PB82-177965] N83-10158
Volcano-tectonic history of Crater Flat, Southwestern Nevada, as suggested by new evidence from drill hole USW-VH-1 and vicinity
[DE82-016957] N83-10690
Magnetometric resistivity survey near Fortymile Wash, Nevada Test Site, Nevada
[DE82-016956] N83-10701
Description of magnetic tape containing trace element data for bedrock geochemical samples from the western Chicagoof-Yakobi Islands Wilderness Study Area, southeastern Alaska
[PB82-191834] N83-10709
GEOLOGICAL SURVEY, HELENA, MONT.
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488
GEOLOGICAL SURVEY, LAKEWOOD, COLO.
Water resources data for Colorado, water year 1980. Volume 3: Dolores River Basin, Green River Basin and San Juan River Basin
[PB82-202045] N83-10486
GEOLOGICAL SURVEY, MENLO PARK, CALIF.
Principal facts, accuracies, sources and base station descriptions for 4915 gravity stations on the San Bernadino 1 deg x 2 deg quadrangle, California
[PB82-200312] N83-10480
GEOLOGICAL SURVEY, PORTLAND, OREG.
Water resources data for Oregon water year 1980. Volume 1: Eastern Oregon
[PB82-190356] N83-10491
GEOLOGICAL SURVEY, TALLAHASSEE, FLA.
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490
GEORGIA INST. OF TECH., ATLANTA.
Probabilistic evaluation of damage potential in earthquake-induced liquefaction in a 3-D soil deposit
[PB82-202276] N83-10708
Review of plasma-impurity sources during Tokamak operation
[DE82-017098] N83-10951
GESAMTHOCHSCHULE, KASSEL (WEST GERMANY).
Electron conductivity of the active masses of lead acid batteries during discharge and permanent service
[BMFT-FB-T-82-078] N83-10619
GESELLSCHAFT FUER ELEKTROMETALLURGIE M.B.H., DUESSELDORF (WEST GERMANY).
Process development for economical processng of various vanadium bearing materials
[BMFT-FB-T-82-097] N83-10630
GESELLSCHAFT FUER KERNENERGIEVERWERTUNG IN SCHIFFBAU UND SCHIFFAHRT M.B.H., GEESTHACHT (WEST GERMANY).
Representation of cracks by dislocations and its application to the fracture toughness of metals
[GKSS-82/E/11] N83-10451
GILBERT/COMMONWEALTH, READING, PA.
Energy recovery and cogeneration from an existing municipal incinerator N83-10589
GIRAVIONS DORAND CO., SURESNES (FRANCE).
The impact of active control on helicopter handling qualities N83-10066
GOODYEAR AEROSPACE CORP., LITCHFIELD PARK, ARIZ.
Edge attachment study for fire-resistant canopies
[NASA-CR-166410] N83-10119
GREATER EGYPT REGIONAL PLANNING AND DEVELOPMENT COMMISSION, CARBONDALE, ILL.
Impact of alternate energy sources in the Greater Egypt region: Franklin, Jackson, Jefferson, Perry and Williamson Counties, Illinois
[PB82-181090] N83-10642
GRUMMAN AEROSPACE CORP., BETHPAGE, N.Y.
Manned geosynchronous mission requirements and systems analysis study add-on
[NASA-CR-167741] N83-10092
Investigations of the tornado wind energy system
[DE82-017122] N83-10601

H

HANFORD ENGINEERING DEVELOPMENT LAB., RICHLAND, WASH.
Guidelines for technical reviews of software products
[DE82-013411] N83-10830
HARRIS CORP., MELBOURNE, FLA.
Optimizing pre- and post-pulses for shaker shock testing N83-10232
HARRY DIAMOND LABS., ADELPHI, MD.
The horizontal wire over Earth as a transmission line: A model surface-impedance approach
[AD-A117993] N83-10334
HEMLOCK SEMICONDUCTOR CORP., MICH.
Flat-plate collector research area: Silicon material task N83-10519
HONEYWELL, INC., MINNEAPOLIS, MINN.
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166262] N83-10027
HONEYWELL SYSTEMS AND RESEARCH CENTER, MINNEAPOLIS, MINN.
Advanced flight control design techniques and handling quality requirements N83-10075
HOUSTON UNIV., TEX.
Water demand for generating electricity: A mathematical programming approach with application in Poland
[IIASA-RR-82-16] N83-10498
HUGHES AIRCRAFT CO., FULLERTON, CALIF.
Vibration qualification of equipment mounted in turboprop aircraft N83-10238
HUGHES AIRCRAFT CO., TORRANCE, CALIF.
Fabrication and development of several heat pipe honeycomb sandwich panel concepts
[NASA-CR-165962] N83-10379
HUGHES RESEARCH LABS., MALIBU, CALIF.
Rotating gravity gradiometer study
[NASA-CR-169440] N83-10404
HUNGARIAN ACADEMY OF SCIENCES, BUDAPEST.
Space research activities in Hungary, 1980 - 1981 N83-11014

I

ILLINOIS INST. OF TECH., CHICAGO.
Surface embrittlement of polyethylene pipe grade resin
[PB82-214370] N83-10204
Application of the Hughes-LIU algorithm to the 2-dimensional heat equation
[NASA-CR-3599] N83-10388
ILLINOIS STATE WATER SURVEY, CHAMPAIGN.
Water chemistry of the Illinois waterway
[PB82-181108] N83-10672
Hydrometeorology of heavy rainstorms in selected Illinois basins
[PB82-202292] N83-10723
ILLINOIS STATE WATER SURVEY, URBANA.
Relationships between rainfall and meteorological surface variables: Applictions to midwestern operational wather modification. Report on OSET, volume 1
[PB82-202805] N83-10721
ILLINOIS UNIV. AT URBANA-CHAMPAIGN, SAVOY.
The boundary integral equation method for torsion of an inhomogeneous variable diameter shaft N83-10445
A study of the eastern Atlantic intertropical convergence zone: Composite structure and initiation of organized convection N83-10681
ILLINOIS UNIV., CHAMPAIGN.
Individual differences and time-sharing ability: A critical review and analysis
[AD-A115082] N83-10778
The use of dual task paradigms in memory research: A methodological assessment and an evaluation of effort as a measure of levels of processing
[AD-A115093] N83-10779
ILLINOIS UNIV., CHICAGO.
Large-area silicon sheet task N83-10520
ILLINOIS UNIV., URBANA.
An experimental investigation of convective losses from solar receivers
[UILU-ENG-81-4003] N83-10500
ILLINOIS UNIV., URBANA-CHAMPAIGN.
Flames in straining flows N83-10136
The effect of phase transformation on the fatigue crack growth rate of austentic stainless steels tested in argon and hydrogen atmospheres N83-10166
Crystal growth, phase transformations and electrical properties of metastable gallium antimonide germanium alloys N83-10167
Field injection electrostatic spraying of liquid hydrogen N83-10215
The hydrodynamics of rotating superfluids N83-10384
The study of the effect of gravity on nozzle flows by hodograph transformation N83-10386
Laser annealing of ion implanted silicon N83-10418
Dynamic characteristics of aluminum gallium arsenide-gallium arsenide conventional and quantum well double heterostructure laser diodes N83-10419
Programming languages for bit-serial array machines N83-10802
Discharge pumped iodine monofluoride laser: Operating parameters and collisional kinetics N83-10901
Paramagnetic resonance studies of crystals N83-10965
The evolution of massive stars: The influence of initial composition and mass loss N83-11002
IMPERIAL COLL. OF SCIENCE AND TECHNOLOGY, LONDON (ENGLAND).
State-of-the-art assessment of mobility measurements: A summary of European results N83-10218
INDIAN COPPER INFORMATION CENTRE, CALCUTTA.
Copper Powder and Chemicals: Edited proceedings of a seminar
[PB82-206202] N83-10192
INDIAN INST. OF TROPICAL METEOROLOGY, POONA.
A study of the anomalous thermal and wind patterns during early summer season of 1979 over the Afro-Asian region in relation to the large scale performance of the monsoon over India
[PB82-204611] N83-10724
Modification of Palmer drought index
[PB82-181751] N83-10731
INSIGHTS WEST, INC., LOS ANGELES, CALIF.
An assessment of vapor compression heat pump technology and applications for industrial processes
[PB82-227596] N83-10285
INSTITUT FUER ERDOELFORSCHUNG, HANOVER (WEST GERMANY).
Critical relationships for displacement processes in oil fields
[BMFT-FB-T-82-093] N83-10479
INSTITUT FUER KEMTECHNIK UND ENERGIEWANDLUNG E.V., STUTTGART (WEST GERMANY).
Investigation of heat storage for temperature range from 200 to 500 C
[BMFT-FB-T-82-105] N83-10627
INSTITUT ROYAL METEOROLOGIQUE DE BELGIQUE, BRUSSELS.
Wind power potential in Belgium
[PUBL-SER-B-115] N83-10563

INSTITUTE OF GAS TECHNOLOGY, CHICAGO, ILL.
Solar-assisted hydrogen generation by photoelectrocatalysis
[PB82-227612] N83-10161
INSTITUTO DE PESQUISAS ESPACIAIS, SAO JOSE DOS CAMPOS (BRAZIL).
Hybrid microwave filters using interdigital and hairpin microstrip resonators
[INPE-2411-PRE/120] N83-10351
Study of the propagation of waves generated by underwater explosions
[INPE-2391-TDL/086] N83-10382
The determination of geoidal waves using spherical harmonics
[INPE-2399-TDL/087] N83-10676
The measurement of X rays 30 KeV in the Brazilian magnetic anomaly with omnidirectional detectors
[INPE-2473-PRE/162] N83-10677
Variability of water vapor flux in the northeast Brazil region
[INPE-2461-PRE/153] N83-10716
Frequency-selective power limiters using the subharmonic generation of spin waves in ferromagnetic materials (LPSF)
[INPE-2451-RPE/412] N83-10964
INSTITUTO DE PESQUISAS ESPACIAIS, SAO PAULO (BRAZIL).
Passive stabilization of satellites by gravity gradient
[INPE-2462-PRE/154] N83-10096
A microwave preselector for a ground station operating at 3.7 A and 4.2 GHz
[INPE-2463-PRE/155] N83-10326
System for broadcasting television by satellite
[INPE-2468-PRE/157] N83-10327
Adaptive estimation of state noise in a Kalman filter
[INPE-2440-PRE/141] N83-10352
Design of 3 dB hybrid couplers using juxtaposed strip lines in homogeneous dielectrics
[INPE-2453-PRE/149] N83-10353
The stabilization of microwave oscillators using cylindrical dielectric resonators
[INPE-2403-TDL/090] N83-10354
Microwave oscillator stabilized by a dielectric resonator at 5.4 GHz
[INPE-2436-PRE/137] N83-10355
High resolution, broad spectral band radiometer
[INPE-2460-TDL/096] N83-10405
A study of ionospheric irregularities in the F region in the equatorial ionosphere over Fortaleza, Natal, and Cachoeira, Paulista
[INPE-2459-TDL/095] N83-10678
The influence of the atmospheric ozone layer on the formation of layer D of the ionosphere at sunrise
[INPE-2487-PRE/171] N83-10679
A study of the structure of the wind over tropical savanna
[INPE-2412-TDL/092] N83-10715
Sensitivity reduction in linear system observers
[INPE-2447-PRE/146] N83-10845
COPLAN, an interactive system for project management
[INPE-2456-PRE/151] N83-10971
Measurement of gamma radiation using a spark chamber carried on a stratospheric balloon
[INPE-2438-PRE/139] N83-11012
INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS, LAXENBURG (AUSTRIA).
Energy for agriculture in Pakistan
[IIASA-RR-82-20] N83-10499
IOWA STATE UNIV. OF SCIENCE AND TECHNOLOGY, AMES.
Fossil-energy
[DE82-018269] N83-10570
Rapid analysis of mineral content of coal: Development of an on-line monitoring instrument for pyrite and ash in coal N83-10571
Ashing properties of coal blends N83-10572
Coal preparation and testing N83-10573
Performance characteristics of heavy media cyclones using fly ash-derived heavy media N83-10574
A systematic investigation of the organosulfur components in coal N83-10575
Microstructure of coal N83-10576
Physicochemical cleaning and recovery of coal N83-10577
ISTITUTO SUPERIORE DI SANITA, ROME (ITALY).
Near infrared refractive index of bismuth germanium oxide (Bi12GeO20)
[ISS-RAD-82/2] N83-10969

J

JAYCOR, SAN DIEGO, CALIF.
Computer modeling of mixing and agglomeration in coal-conversion reactors. Volume 1: Model formulation
[DE82-014836] N83-10212
JET PROPULSION LAB., CALIFORNIA INST. OF TECH., PASADENA.
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040
End-to-end imaging information rate advantages of various alternative communication systems
[NASA-CR-169428] N83-10321
Total-dose radiation effects data for semiconductor devices, volume 3
[NASA-CR-169430] N83-10350
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
Thermal reactor
[NASA-CASE-NPO-14369-1] N83-10501
Resource targets for advanced underground coal extraction systems
[NASA-CR-169429] N83-10503
Correlation of design with performance of primary lithium-sulfur oxyhalide cells
[NASA-CR-169369] N83-10504
Flat Plate Solar Array Project: Proceedings of the 20th Project Integration Meeting
[NASA-CR-169370] N83-10505
FSAs future role N83-10507
Union Carbide Corp. polysilicon status and plans N83-10508
Block 5 module design summary N83-10510
Sacremento Municipal Utility District 100-MW sub e photovoltaic plant N83-10513
Flat-plate collector research area: Silicon material task N83-10519
Large-area silicon sheet task N83-10520
Environmental isolation task N83-10521
Cell and module formation research area N83-10522
Engineering sciences area and module performance and failure analysis area N83-10523
Project analysis and integration area N83-10524
Parabolic Dish Solar Thermal Power Annual Program Review, proceedings
[NASA-CR-169365] N83-10525
Development status of the PDC-1 Parabolic Dish Concentrator N83-10526
The small community solar thermal power experiment N83-10531
Recent tests on the Carter small reciprocating steam engines N83-10536
Potential benefits from a successful solar thermal program N83-10547
Configuration selection study for isolated loads using parabolic dish modules N83-10548
Solar thermal technologies benefits assessment: Objectives, methodologies and results for 1981
[NASA-CR-169373] N83-10551
User handbook for block IV silicon solar cell modules
[NASA-CR-169431] N83-10552
Photovoltaic module encapsulation design and materials selection, volume 1, abridged
[NASA-CR-169372] N83-10553
JOHANN-WOLFGANG-GOETHE-UNIVERSITAT, FRANKFURT AM MAIN (WEST GERMANY).
Convective thinning of the lithosphere: A mechanism for rifting and mid-plate volcanism on Earth, Venus, and Mars
[NASA-CR-169434] N83-10680
JOHNS HOPKINS UNIV., BALTIMORE, MD.
Vertical mixing and nutrient transport in the Chesapeake Bay
[PB82-178708] N83-10748
Health effects of low level radiation in shipyard workers
[DE82-001112] N83-10770
Behavioral and biological interactions with small groups in confined microsocieties
[NASA-CR-139445] N83-10777
Upsets in microprocessor controllers N83-10791
JOINT CENTER FOR GRADUATE STUDY, RICHLAND, WASH.
Conceptual design and cost analysis of hydraulic output unit for 15 kW free-piston Stirling engine
[NASA-CR-165543] N83-10561
JOINT PUBLICATIONS RESEARCH SERVICE, ARLINGTON, VA.
USSR report: Earth sciences, no. 23
[JPRS-81965] N83-10713
Kola superdeep hole N83-10714

K

KABELMETAL ELECTRO G.M.B.H., HANNOVER (WEST GERMANY).
Flexible gas insulated cable for high power transmission
[BMFT-FB-T-82-099] N83-10370
KAJIMA INST. OF CONSTRUCTION TECHNOLOGY, TOKYO (JAPAN).
The solar assisted air-source heat pump system, part 1
[PB82-218439] N83-10286
KALLE, WIESBADEN (WEST GERMANY).
Magnetooptical light switches in electrophotographic printers
[BMFT-FB-T-82-092] N83-10410
KANSAS UNIV., LAWRENCE.
Mathematical programming in plastic analysis N83-10444
A combined optical/microwave approach to crop classification N83-10457
KAYEX CORP., ROCHESTER, N. Y.
Advanced Czohcralski ingot growth N83-10509
Large-area silicon sheet task N83-10520
KB UNITED STIRLING AB & CO., MALMOE (SWEDEN).
Modifications and testing of a 4-95 Stirling engine for solar applications N83-10538
KENTUCKY UNIV., LEXINGTON.
Sunlight induced movement of planktonic organisms and their relationships to water movements
[PB82-211509] N83-10660
KING RADIO CORP., OLATHE, KANS.
Demonstration Advanced Avionics System (DAAS) function description
[NASA-CR-166282] N83-10027
KMS FUSION, INC., ANN ARBOR, MICH.
PICLE: A 2-D code for laser-beam - gas-jet interaction studies
[DE82-007256] N83-10394
KOCKUMS A.B., MALMOE (SWEDEN).
Calculating responses in hull mounted items of equipment in submarines compared with measurements carried out during shock tests N83-10242
A computer-controlled measuring system having 128 analog measuring channels and facilities for signal analysis N83-10243
A large-scale submarine shock test carried out as part of the Swedish Shock Design Development Program N83-10244
KONSTANZ UNIV. (WEST GERMANY).
Investigation of new solar cells. Part A: Novel semiconductors and their suitability. Part B: Polycrystalline MIS diodes
[BMFT-FB-T-82-103] N83-10632
KRAFTWERK UNION A.G. REAKTORTECHNIK, ERLANGEN (WEST GERMANY).
Hard coal gasification using catalysts dissolved in steam
[BMFT-FB-T-82-107] N83-10146

L

LENOX INST. FOR RESEARCH, INC., MASS.
First full-scale flotation plant in the USA for portable water treatment
[PB82-220690] N83-10653
LETTERMAN ARMY INST. OF RESEARCH, SAN FRANCISCO, CALIF.
Field production of purified sterile water from available water sources by using a portable apparatus
[AD-A117319] N83-10649
The development and evaluation of hemoglobin solution as a blood substitute
[AD-A117318] N83-10764
LINCOLN LAB., MASS. INST. OF TECH., LEXINGTON.
Ground-based electro-optical detection of artificial satellites in daylight from reflected sunlight
[AD-A117413] N83-10098
Rooftop applications N83-10515
Engineering sciences area and module performance and failure analysis area N83-10523
Seismic discrimination
[AD-A116884] N83-10686
LINDE A.G., HOLLRIEGELSKREUTH (WEST GERMANY).
Refrigeration system of superconducting generators for large power plants
[BMFT-FB-T-82-071] N83-10369
LOCKHEED-CALIFORNIA CO., BURBANK.
Advanced residual strength degradation rate modeling for advanced composite structures
[AD-A115185] N83-10121

LOCKHEED MISSILES AND SPACE CO., HUNTSVILLE, ALA.
Effect of enclosure shape on natural convection velocities
[NASA-CR-169444] N83-10387

LOCKHEED MISSILES AND SPACE CO., PALO ALTO, CALIF.
Transient response analysis of a large radar antenna N83-10265
Low-authority control synthesis for large space structures
[NASA-CR-3495] N83-10441

LORD KINEMATICS, ERIE, PA.
The experimental performance of an on-off active damper N83-10227

LOS ALAMOS SCIENTIFIC LAB., N. MEX.
Dye-laser development for plasma magnetic-field diagnostic
[DE82-016421] N83-10421
Geologic evolution of the Jemez Mountains and their potential for future volcanic activity
[DE82-008975] N83-10694
Earthquake catalog for Northern New Mexico
[DE82-015900] N83-10698
User's manual for DISPAK, an easy approach to DISSPLA graphics
[DE82-010902] N83-10829
Casual User Project: Problems, proposed solutions, and implementation
[DE82-016407] N83-10842
Numerical calculation of the Thomas-Fermi-von Weizsacker function for an infinite atom without electron repulsion
[DE82-014123] N83-10893
Proposal to develop techniques using magneto-optic and electro-optic effects in optical fiber for CTR diagnostics
[DE82-009548] N83-10907
Behavior of a plasma in a high-density gas-embedded Z-pinch configuration
[DE82-017396] N83-10935
Parametric systems analysis of the Modular Stellarator Reactor (MSR)
[DE82-016244] N83-10945
PLOTT: A graphics application package for production of publication-quality graphs
[DE82-015031] N83-10985

LOS ALAMOS TECHNICAL ASSOCIATES, INC., N. MEX.
ODD user manual: The other data display
[DE82-013750] N83-10812

LOUISIANA ADVISORY COMMISSION ON COASTAL AND MARINE RESOURCES, BATON ROUGE.
An integrated pavement data management and feedback system (PAMS)
[PB82-224429] N83-10288

LOUISIANA STATE UNIV., BATON ROUGE.
The development of a geopressured energy management information system in support of research planning, phase 1
[PB82-207366] N83-10638

M

MAGRATH (HOWARD A.), DAYTON, OHIO.
Evaluation Report: The Specialists' Meeting on Dynamic Environmental Qualification Techniques
[AGARD-AR-183] N83-10039

MARQUARDT CORP., VAN NUYS, CALIF.
Quick Look assessment and comparison of vibration specifications N83-10239

MARTIN MARIETTA AEROSPACE, ORLANDO, FLA.
Manufacturing techniques of large scale hybrid microelectronics
[AD-A117542] N83-10361

MARYLAND ACADEMY OF SCIENCES, BALTIMORE.
Environmental Research Guiding Committee report
[PB82-220070] N83-10661

MARYLAND UNIV., COLLEGE PARK.
Computer analysis of steel box girder bridges
[PB82-184912] N83-10276
Global analysis of problems from nonlinear thermoelasticity N83-10437
Study of energy loss during a fracture event N83-10438
A numerical study on the interaction of atmospheric internal gravity waves and cumulus convection N83-10682
Approximate solutions to queueing networks with state dependent parameters N83-10847

MASCHINENFABRIK AUGSBURG-NUERNBERG A.G., MUNICH (WEST GERMANY).
Tests with concentrating collectors
[BMFT-FB-T-82-104] N83-10626

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
Market diffusion and the effect of demonstrations: A study of Denver metro passive solar home program
[PB82-180332] N83-10296
Alternative electric generation impact simulator
[PB82-180324] N83-10302
User's manual for LINEAR, a computer program that calculates the linear characteristics of a gyrotron
[DE82-012569] N83-10365
A review of structural noise transmission N83-10434
A second-order Budkyo-type parameterization of landsurface hydrology
[NASA-CR-169432] N83-10472
Coupled near and far field thermal plume analysis using finite element techniques
[PB82-180316] N83-10667
Behavior of buoyant moist plumes in turbulent atmospheres
[PB82-180241] N83-10668
Control of NO sub x by combustion process modifications
[PB82-180175] N83-10669
Seismicity and active tectonics of the Andes and the origin of the Altiplano
[NASA-CR-169362] N83-10675
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 2: Space projects overview
[NASA-CR-162080-VOL-2] N83-10848
Space applications of Automation, Robotics and Machine Intelligence Systems (ARAMIS). Volume 4: Application of ARAMIS capabilities to space project functional elements
[NASA-CR-162082-VOL-4] N83-10849
Radial effects in heating and thermal stability of a sub-ignited Tokamak
[DE82-009384] N83-10932
Antenna-plasma coupling theory for ICRF heating of large tokamaks
[DE82-013226] N83-10933
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] N83-10934
Observation of the parametric decay instability during electron cyclotron resonance heating on the Versator 2 Tokamak
[DE82-012573] N83-10939
Excitation of quasi-electrostatic modes in a magnetized plasma by a modulated hollow E-beam
[DE82-008441] N83-10944
Description of the Fokker-Plank code used to model ECRH of the Constance 2 plasma
[DE82-007912] N83-10950
Grain-boundary segregation in aluminum-doped silicon carbide
[DE82-015264] N83-10967
Investigations of interlibrary resource-sharing networks
[PB82-202417] N83-10987

MATERIALS RESEARCH LABS., MELBOURNE (AUSTRALIA).
Separation of nitration by-products in commercial-grade trinitro-toluene by high performance liquid chromatography
[MRL-TN-464] N83-10209

MATRECON, INC., OAKLAND, CALIF.
More economical but equally effective internally sealed concrete
[PB82-208075] N83-10306

MAX-PLANCK-INSTITUT FUER PLASMAPHYSIK, GARCHING (WEST GERMANY).
Self consistent loop antenna theory
[IPP-4/205] N83-10319
Consistent guiding center drift theories
[IPP-6/212] N83-10914

MCDONNELL AIRCRAFT CO., ST. LOUIS, MO.
Equivalent systems criteria for handling qualities of military aircraft N83-10057

MCDONNELL-DOUGLAS ASTRONAUTICS CO., ST. LOUIS, MO.
Airborne Flight Test System (AFTS)
[AD-A115100] N83-10330

MCDONNELL-DOUGLAS CORP., LONG BEACH, CALIF.
A combined hazard index fire test methodology for aircraft cabin materials, volume 1
[AD-A117448] N83-10025
A combined hazard index fire test methodology for aircraft cabin materials, volume 2
[AD-A117449] N83-10026

MCNEESE STATE UNIV., LAKE CHARLES, LA.
Standardization of sampling and analysis of geopressured fluids. Part 2: Monitoring of geopressured wells N83-10151

MECHANICAL TECHNOLOGY, INC., LATHAM, N. Y.
A 400-kWe high-efficiency steam turbine for industrial cogeneration N83-10537
A conceptual study of the potential for automotive-derived and free-piston Stirling engines in 30- to 400-kilowatt stationary power applications
[NASA-CR-165274] N83-10568
Automotive Stirling Engine Mod 1 Design Review, volume 2
[NASA-CR-167936] N83-10991

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., MUNICH (WEST GERMANY).
Gain and phase margin as a basis of longitudinal flying qualities evaluation N83-10059
Handling qualities criteria for longitudinal control N83-10062
Stability and control for high angle of attack maneuvering N83-10069
A point focusing collector for an integrated water/power complex N83-10541

MESSERSCHMITT-BOELKOW-BLOHM G.M.B.H., OTTOBRUNN (WEST GERMANY).
Calculation of three dimensional unsteady transonic flow around rotor blades
[MBB-UD-353] N83-10021
Design simplification and cost reduction of helicopter tail rotor drive system by use of composites
[MBB-UD-348] N83-10037
Study and detailed definition of Modular digital Attitude Control System (MACS)
[ESA-CR(P)-1614] N83-10101

MICHIGAN UNIV., ANN ARBOR.
Direct sequence spread spectrum communications: Applications to multiple access and jamming resistance N83-10328
A study of dropwise and film condensation under variable gravity fields N83-10385
Air motion in a two stroke diesel engine cylinder N83-10423
Meteorological assessment of SRM exhaust products' environmental impact
[NASA-CR-169453] N83-10648
The MG plus airglow in the low latitude ionosphere: Observations and theoretical modelling N83-10663
Theory of testing computer programs N83-10805
Superposition of Markov renewal processes N83-10866
Passenger car occupant ejection
[PB82-202409] N83-10993

MIDDLESEX COUNTY DEPT. OF SOLID WASTE MANAGEMENT, NEW BRUNSWICK, N.J.
Institutional factors in resource recovery co-disposal demonstration project, Middlesex County, New Jersey, Spring 1980 - Summer 1981 N83-10588

MIDWEST RESEARCH INST., GOLDEN, COLO.
Imaging radiometry systems
[DE82-015862] N83-10364
Evaluation of advanced R and D topics in photovoltaics N83-10518
Investigations of the tornado wind energy system
[DE82-017122] N83-10601

MIDWEST RESEARCH INST., KANSAS CITY, MO.
Evaluation of methods for rapid determination of freezing point of aviation fuels
[NASA-CR-167981] N83-10207
An economic and engineering analysis of the full-scale trommel screen operations at Baltimore County, Maryland N83-10581

MINNESOTA UNIV., MINNEAPOLIS.
Numerical and graphical procedures for estimation of community photosynthesis and respiration in experimental streams
[PB82-220765] N83-10482

MISSOURI UNIV., COLUMBIA.
The fabrication and evalution of a silicon photovoltaic cell with a directly nitrided tunnel insulator N83-10564

MITRE CORP., BEDFORD, MASS.
On board processing for future satellite communications systems: Comparison of FDM, TDM and hybrid accessing schemes
[NASA-CR-167931] N83-10325

MOBIL TYCO SOLAR ENERGY CORP., WALTHAM, MASS.
Photovoltaic research needs industry perspective N83-10516
Large-area silicon sheet task N83-10520

MONTANA DEPT. OF NATURAL RESOURCES AND CONSERVATION, HELENA.
Steamflow characteristics of the upper Columbia River Basin, Montana through 1979
[PB82-185760] N83-10488

N

NAGOYA UNIV. (JAPAN).
Sausage instability of Z-discharged plasma channel in LIB-fusion device
[IPPJ-602] N83-10917

Measurement of electron cyclotron emission from JIPP T-11 plasma
[IPPJ-596] N83-10918
Plasma equilibrium and field diffusion during current rise phase of STP-2 screw pinch Tokamak
[IPPJ-594] N83-10919
US-Japan Joint Institute for Fusion Theory Workshop on Nonequilibrium Statistical Physics Problems in Fusion Plasmas: Stochasticity and Chaos
[IPPJ-587] N83-10920
US-Japan Workshop on Burning Plasma Physics and Engineering
[IPPJ-599] N83-10921
US-Japan Joint Institute for Fusion Theory Workshop on Equilibrium, Stability and Transport of Nonaxisymmetric Systems
[IPPJ-577] N83-10922

NATIONAL ACADEMY OF SCIENCES - NATIONAL RESEARCH COUNCIL, WASHINGTON, D. C.
An evaluative report on the National Measurement Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197039] N83-10089
An evaluative report on the National Engineering Laboratory, National Bureau of Standards, fiscal year 1981
[PB82-197047] N83-10090
Aviation turbine fuels: An assessment of alternatives
[NASA-CR-169395] N83-10214
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] N83-10373
NO sub x emission control for heavy duty vehicles: Toward meeting a 1986 standard
[PB82-183880] N83-10665
Causes and effects of stratospheric ozone reduction: An update
[PB82-209644] N83-10789
The DOD-NASA independent research and development program: Issues and methodology for an in-depth study
[PB82-192741] N83-10977

NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, WASHINGTON, D.C.
A report to the President and the Congress by the National Advisory Committee on Oceans and Atmosphere
[PB82-182882] N83-10747

NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO).
Flight experiments with integrated isometric side-arm controllers in a variable stability helicopter N83-10068

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, WASHINGTON, D. C.
Aeronautical Engineering. A continuing bibliography with indexes (supplement 151)
[NASA-SP-7037(151)] N83-10001
JBFA-buoyant flight, special edition
[NASA-TM-76814] N83-10002
Post launch report on the heat capacity mapping mission
[NASA-TM-84859] N83-10095
Mission operation report. RCA-E/Delta launch
[NASA-TM-84869] N83-10097
STS-4 test mission simulates operational flight: President terms success golden spike in space
[NASA-TM-84866] N83-10103
Columbia's second mission. STS-2, the first flight of a used spacecraft
[NASA-TM-84865] N83-10104
STS-3, busiest and most successful test mission
[NASA-TM-84864] N83-10105
A free people capable of great deeds, the story of STS-1, the first Space Shuttle mission
[NASA-TM-84863] N83-10106
Earth Resources. A continuing bibliography with indexes, issue 34, July 1982
[NASA-SP-7041(34)] N83-10456
Morphological studies of the skeletal muscles of rats during hypokinesia
[NASA-TM-76887] N83-10749
Aerospace medicine and biology, a continuing bibliography with indexes. Supplement 236
[NASA-SP-7011(236)] N83-10758
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 1: Abstracts
[NASA-SP-7039(21)-SECT-1] N83-10978
NASA patent abstracts bibliography, a continuing bibliography. Supplement 21. Section 2: Abstracts
[NASA-SP-7039(21)-SECT-2] N83-10979
NASA Thesaurus. Volume 1: Hierarchical listing
[NASA-SP-7051-VOL-1] N83-10980
NASA Thesaurus. Volume 2: Access vocabulary
[NASA-SP-7051-VOL-2] N83-10981
Anomalous twilights related to the Tungussk Meteorite
[NASA-TM-76707] N83-11006

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. AMES RESEARCH CENTER, MOFFETT FIELD, CALIF.
An integrated user-oriented laboratory for verification of digital flight control systems: Features and capabilities
[NASA-TM-84276] N83-10048
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 1: Technical discussion and results
[NASA-TM-84258-PT-1] N83-10049
A piloted simulator investigation of stability and control, display and crew-loading requirements for helicopter instrument approach. Part 2: Supporting data
[NASA-TM-84258-PT-2] N83-10050
A mathematical model of a single main rotor helicopter for piloted simulation
[NASA-TM-84281] N83-10051
Prediction of aircraft handling qualities using analytical models of the human pilot N83-10079
Preliminary analysis of STS-4 entry flight data
[NASA-TM-81375] N83-10109
Holographic interferometry technique for rotary wing aerodynamics and noise
[NASA-TM-84723] N83-10378

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. GODDARD SPACE FLIGHT CENTER, GREENBELT, MD.
The LANDSAT tutorial workbook: Basics of satellite remote sensing
[E83-10001] N83-10458
Some fundamental concepts in remote sensing N83-10459
Familiarization with LANDSAT imagery N83-10460
Some spectral and spatial characteristics of LANDSAT data N83-10461
Photointerpretation of LANDSAT images N83-10462
Computer processed LANDSAT data N83-10463
Near surface observations N83-10464
Geographic information systems N83-10465
A case study in the practical use of LANDSAT data N83-10466
Other remote sensing systems: Retrospect and outlook N83-10467
Some closing thoughts: Practical payoffs from satellite systems N83-10468
Appendix A: The LANDSAT system N83-10469
Appendix B: Principles of computer processing of LANDSAT data N83-10470
Appendix C. LANDSAT: A worldwide perspective N83-10471
Signal analysis and error analysis studies for a Geopotential Research Mission (GRM)
[NASA-TM-83970] N83-10674
Multiprism collimator
[NASA-CASE-GSC-12608-1] N83-10900
Preliminary submillimeter spectroscopic measurements using a submillimeter heterodyne radiometer
[NASA-TM-83964] N83-10903
Observational tests of Baryon symmetric cosmology
[NASA-TM-84006] N83-10996
The peculiar extinction of Herschel 36
[NASA-TM-84893] N83-10998
Far infrared supplement: Catalog of infrared observations
[NASA-TM-84001] N83-10999
Stationarity of magnetohydrodynamic fluctuations in the solar wind
[NASA-TM-83963] N83-11007
A study of the diffuse galactic gamma radiation
[NASA-TM-83992] N83-11010
On the origin of relativistic particles and gamma-rays in quasars
[NASA-TM-83983] N83-11011

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LANGLEY RESEARCH CENTER, HAMPTON, VA.
An experimental and theoretical investigation of thick wings at various sweep angles in and out of ground effect
[NASA-TP-2068] N83-10016
Comparison of analytical and experimental subsonic steady and unsteady pressure distributions for a high-aspect-ratio-supercritical wing model with oscillating control surfaces
[NASA-TM-84490] N83-10017
Low-altitude wind measurements from wide-body jet transports
[NASA-TM-84538] N83-10024
The design integration of wingtip devices for light general aviation aircraft
[NASA-TM-83252] N83-10034
Flutter clearance of the horizontal tail of the Bellanca Skyrocket II airplane
[NASA-TM-84528] N83-10035
Sensitivity analysis of cool-down strategies for a transonic cryogenic tunnel
[NASA-TM-84527] N83-10082
A parametric study of the Ibrahim time domain modal identification algorithm N83-10258
Characterization of particles in the Langley 0.3 meter transonic cryogenic tunnel using hot wire anemometry
[NASA-TM-84551] N83-10407
A blackbody radiation-pumped CO2 laser experiment
[NASA-TM-84541] N83-10420
Crash tests of four low-wing twin-engine airplanes with truss-reinforced fuselage structure
[NASA-TP-2070] N83-10442
Optimization of composite structures
[NASA-TM-84544] N83-10447
NECAP 4.1: NASA's Energy-Cost Analysis Program fast input manual and example
[NASA-TM-83241] N83-10566
Analysis of high altitude remotely sensed data collected in the Nantucket Shoals experiment 4-15 May, 1981
[NASA-TM-84547] N83-10647
The cost of software fault tolerance
[NASA-TM-84546] N83-10806
Flight effects of fan noise
[NASA-CP-2242] N83-10883

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. LEWIS RESEARCH CENTER, CLEVELAND, OHIO.
Wind tunnel tests of a zero length, slotted-lip engine air inlet for a fixed nacelle V/STOL aircraft
[NASA-TM-82939] N83-10019
Further industrial tests of ceramic thermal barrier coatings
[NASA-TP-2057] N83-10045
Ion sputter textured graphite
[NASA-CASE-LEW-12919-1] N83-10117
Lower-curing-temperature PMR polyimides
[NASA-TM-82958] N83-10118
Pore size engineering applied to starved electrochemical cells and batteries
[NASA-TM-82893] N83-10134
Polyvinyl alcohol membranes as alkaline battery separators
[NASA-TM-82961] N83-10135
Mechanical bonding of metal method
[NASA-CASE-LEW-12941-1] N83-10170
Friction and wear of iron and nickel in sodium hydroxide solutions
[NASA-TM-82935] N83-10171
Plasma deposition and surface modification techniques for wear resistance
[NASA-TM-82972] N83-10194
Literature survey of properties of synfuels derived from coal
[NASA-TM-82739] N83-10208
Multi-stage Depressed Collectors (MDC) for efficiency improvements of UHF broadcast klystrons
[NASA-TM-82970] N83-10322
Implicit marching solution of compressible viscous subsonic flow in planar and axisymmetric ducts
[NASA-TM-82876] N83-10389
Life and reliability models for helicopter transmissions
[NASA-TM-82976] N83-10425
Method for depositing an oxide coating
[NASA-CASE-LEW-13131-1] N83-10494
The effect of Ta2O5 on the interaction between silicon and its contact metallization
[NASA-TM-82948] N83-10554
Evaluation of electrode shape and nondestructive evaluation method for welded solar cell interconnects
[NASA-TM-82966] N83-10555
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] N83-10556
Evaluation of advanced combustion concepts for dry NO sub x suppression with coal-derived, gaseous fuels
[NASA-TM-82985] N83-10557
Expected cycle life versus depth of discharge relationships of well behaved single cells and cell strings
[NASA-TM-82957] N83-10558
Multifuel evaluation of rich/quench/lean combustor
[NASA-TM-82986] N83-10559
Combustion characteristics of hydrogen. Carbon monoxide based gaseous fuels
[NASA-TM-82998] N83-10560
Utilizing numerical techniques in turbofan inlet acoustic suppressor design
[NASA-TM-82994] N83-10885
Radiation damage in front and back illuminated high resistivity silicon solar cells
[NASA-TM-82965] N83-10962

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. MARSHALL SPACE FLIGHT CENTER, HUNTSVILLE, ALA.
Exothermic furnace module development
[NASA-TM-82500] N83-10093

Tolerance requirements to prevent fluid leakage in the crucible/plunger MEA experiment MPS 770030
[NASA-TM-82497] N83-10094
Atmospheric environment for Space Shuttle (STS-4) launch
[NASA-TM-82498] N83-10108
Refurbishment of SRB aluminum components by walnut hull blast removal of protective coatings
[NASA-TM-82499] N83-10113
Electrophoresis device
[NASA-CASE-MFS-25426-1] N83-10126
Combinational logic for generating gate drive signals for phase control rectifiers
[NASA-CASE-MFS-25208-1] N83-10345
Variable reluctance proximity sensors for cryogenic valve position indication
[NASA-TM-82493] N83-10424
Nonlinear optimization with linear constraints using a projection method
[NASA-TP-2086] N83-10876

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION. PASADENA OFFICE, CALIF.
CAT altitude avoidance system
[NASA-CASE-NPO-15351-1] N83-10040
Method and apparatus for convection control of metallic halide vapor density in a metallic halide laser
[NASA-CASE-NPO-15021-1] N83-10417
Thermal reactor
[NASA-CASE-NPO-14369-1] N83-10501

NATIONAL AEROSPACE LAB., AMSTERDAM (NETHERLANDS).
Analysis of possible interference in radio altimeters induced by a position marker system called RASP
[NLR-TR-81135-U] N83-10043
Handling qualities of transports with advanced flight control systems N83-10061
Evaluation Report: AGARD Fluid Dynamics Panel Symposium on Fluid Dynamics of Jets with Application to V/STOL
[AGARD-AR-187] N83-10403
Models for human observing, controlling and decision making in a dynamic system
[NLR-MP-81036-U] N83-10785
A small Strouhal number analysis for acoustic wave - jet flow pipe interaction
[NLR-MP-80011-U] N83-10888

NATIONAL BUILDING RESEARCH INST., PRETORIA (SOUTH AFRICA).
Corrosion of architectural and structural metals and metal coatings in South Africa
[PB82-185869] N83-10181
The use of therml sprayed coatings to combat atmospheric corrosion in the building and construction industry
[PB82-185836] N83-10182
Low maintenance building with inorganic materials
[PB82-206343] N83-10307

NATIONAL BUREAU OF STANDARDS, WASHINGTON, D.C.
Standard reference materials: A standard reference material containing nominally fifteen percent austenite (SRM 486)
[PB82-215559] N83-10147
Migration of low molecular weight additives in polyolefins and copolymers
[PB82-196403] N83-10153
An introduction to chemiluminescence methods for lubricant oxidation studies
[PB82-207515] N83-10199
Low molecular weight leachables from medical grade polymers
[PB82-105766] N83-10200
Benefits and costs of improved measurements: The case of integrated circuit photomask linewidths
[PB82-217183] N83-10284
Economics and energy conservation in the design of new single-family housing
[PB82-203639] N83-10294
Analysis of thermal comfort in a passive solar heated residence
[PB82-180142] N83-10297
Calculations of the heat release rate by oxygen consumption for various applications
[PB82-192956] N83-10304
A study of the electromagnetic fields distribution inside buildings with apertures excited by an external source
[PB82-193418] N83-10341
CS1: A two-dimensional finite element charge-sheet model of a short-channel MOS transistor
[PB82-205709] N83-10376
Application of the method of characteristics to predict attenuation in unsteady partially filled pipe flow
[PB82-196700] N83-10400
Economic efficiency in the sizing of residential heat pumps
[PB82-179029] N83-10401
A measurement method for determining the optical and electro-optical properties of a thin film
[PB82-177981] N83-10416
A laboratory approach to obtain suspension combustion data for reuse derived fuels N83-10579
An oxygen flow calorimeter for determining the heating value of kilogram size samples of municipal solid waste N83-10580
Characterization of RDF properties through high pressure differential scanning calorimetry N83-10582
Medical Physics Data Book
[PB82-217175] N83-10775
Standard reference materials: Preparation and calibration of first surface aluminum mirror specular reflectance standards
[PB82-221367] N83-10909

NATIONAL GEOPHYSICAL AND SOLAR-TERRESTRIAL DATA CENTER, BOULDER, COLO.
Solar-geophysical data. Part 2: Comprehensive reports. Data for August 1981
[PB82-200932] N83-11008
Solar-Geophysical Data Number 450, supplement. Explanation of data reports
[PB82-200940] N83-11009

NATIONAL GOVERNORS ASSOCIATION/COUNCIL OF STATE PLANNING AGENCIES, WASHINGTON, D. C.
State-Local Policy Management Project, 1981
[PB82-192600] N83-10973

NATIONAL HURRICANE CENTER, CORAL GABLES, FLA.
A statistical dynamical model for prediction of tropical cyclone motion in the eastern north Pacific Ocean
[PB82-195298] N83-10732

NATIONAL HYDROELECTRIC POWER CORP. LTD., NEW DELHI (INDIA).
Seminar on Accelerated Hydroelectric Development in India: Proceedings, volume 1
[PB82-217753] N83-10634
Seminar on Accelerated Hydroelectric Development in India: Post session proceedings, volume 2
[PB82-217761] N83-10635

NATIONAL INST. FOR TRANSPORT AND ROAD RESEARCH, PRETORIA (SOUTH AFRICA).
The transportation of hazardous materials
[RV/1/81] N83-10990

NATIONAL INST. VOOR KERNFYSICA EN HOGE ENERGIEYSICA, AMSTERDAM (NETHERLANDS).
A design study of the vacuum system of the Daresbury X-8 experimental line. Part 1: The front-end system
[MTG-17] N83-10275

NATIONAL LIBRARY OF MEDICINE, BETHESDA, MD.
Medical subject headings, Tree annotations, 1983
[PB82-208653] N83-10773

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ANN ARBOR, MICH.
A two-dimensional lake circulation modeling system
[PB82-185372] N83-10489

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, BOULDER, COLO.
Selected geophysical activities of the United States, 1977-1981. A quinquennium of cooperation and progress
[PB82-202847] N83-10487
Surface meteorological features associated with eastern Colorado severe convective storms
[PB82-203134] N83-10722
FACE-1: The operational design and derivation of the basic and ancillary data sets
[PB82-215104] N83-10727
FACE-2 data reductions (prior to disclosure of the treatment decisions). Part 5: Satellite-estimated rainfall from a geostationary platform in FACE-2
[PB82-216581] N83-10730
Ocean pollution research, development and monitoring
[PB82-219049] N83-10740
The mean and variance of skywave radar sea-echo power spectra
[PB82-175969] N83-10744

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, MIAMI, FLA.
Analysis of the accuracy of the inter-ocean CSTD sensors used on the MESA New York Bight Project
[PB82-215815] N83-10742

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ROCKVILLE, MD.
Results of leveling refraction tests by the National Geodetic Survey
[PB82-193921] N83-10484
The National Plan for Stratospheric Ozone Monitoring and Early Detection of Change, 1981 - 1986
[PB82-203159] N83-10706
Effects of detection algorithm on accuracy degradation from logarithmic and difference processing for airborne laser bathymetry returns
[PB82-215138] N83-10707
Weather constraints on airborne laser hydrography operations
[PB82-169754] N83-10745
The eastern Bering Sea shelf: Oceanography and resources, volume 2
[PB82-181306] N83-10746

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SEATTLE, WASH.
Hydrographic measurements during the 1978 cooperative Soviet-American Tsunami expedition
[PB82-215096] N83-10743

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, SILVER SPRING, MD.
Stratospheric lidar investigation of the Mt. St. Helens volcanic cloud over Boulder, Colorado
[PB82-215070] N83-10711

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, WASHINGTON, D. C.
Ocean dumping monitoring and research, January through December 1979
[PB82-176231] N83-10671
The federal plan for meteorological services and supporting research, fiscal year 1983
[PB82-215708] N83-10725
Intercomparison of primary and secondary standard seawater samples
[PB82-215716] N83-10741

NATIONAL PHYSICAL LAB., TEDDINGTON (ENGLAND).
The depth dependence of the depth resolution in composition-depth profiling with Auger electron spectroscopy
[NPL-DMA(A)-50] N83-10133
Theoretical modelling of the electrochemistry in a corrosion fatigue crack. Numerical solution of time-dependent mass conservation equations involving advection, diffusion and ion-migration
[NPL-DMA(A)-44] N83-10169

NATIONAL RESEARCH INST. FOR OCEANOLOGY, STELLENBOSCH (SOUTH AFRICA).
The routine processing and analysis of AANDERAA meter data
[CSIR-T/SEA-7910] N83-10735

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION, BOULDER, COLO.
Elevated duct data-base improvement
[PB82-215906] N83-10343

NATIONAL TIMBER RESEARCH INST., PRETORIA (SOUTH AFRICA).
Tannin adhesives: From laboratory to industry
[PB82-206814] N83-10203

NATIONAL TRANSPORTATION SAFETY BOARD, WASHINGTON, D. C.
Aircraft accident report. Air Florida, Inc. Boeing 737-222, N62AF collision with 14th Street Bridge, near Washington National Airport, Washington, D.C., January 13, 1982
[PB82-916408] N83-10022

NATIONAL WEATHER SERVICE, ANCHORAGE, ALASKA.
Empirical probabilities of the ice limit and fifty percent ice concentration boundary in the Chuckchi and Beaufort Seas
[AD-A116849] N83-10736

NATIONAL WEATHER SERVICE, SALT LAKE CITY, UTAH.
Central San Joaquin Valley type maps
[PB82-196064] N83-10733

NATIONAL WEATHER SERVICE, SILVER SPRING, MD.
The sea level prediction model of the local AFOS MOS program
[PB82-215492] N83-10726

NAVAL AIR DEVELOPMENT CENTER, WARMINSTER, PA.
Status of VTOL and VSTOL flying qualities criteria development: Where are we and where are we going? N83-10056

NAVAL BIODYNAMICS LAB., NEW ORLEANS, LA.
Implications of dual-task performance variables for design of generic workstations: Literature review
[AD-A114421] N83-10782
Human performance tests for repeated measurements: Alternate forms of eight tests by computer
[AD-A115021] N83-10784

NAVAL OCEAN RESEARCH AND DEVELOPMENT ACTIVITY, BAY ST. LOUIS, MISS.
A discrete nonlinear spectral model for ocean wave prediction, description of computer program
[AD-A114354] N83-10738

NAVAL OCEAN SYSTEMS CENTER, SAN DIEGO, CALIF.
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768

NAVAL OCEANOGRAPHIC OFFICE, BAY ST. LOUIS, MISS.
Variability in the mixed layer depth near the polar front
[AD-A117154] N83-10737

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
Typhoon motion forecasting empirical orthogonal function analysis of the synoptic forcing
[AD-A117539] N83-10717
A simulator evaluation of pilot response to low frequency aircraft vibration with audio feedback
[AD-A117540] N83-10786
An interactive computer program for the preliminary design and analysis of marine reduction gears
[AD-A117828] N83-10808
NAVAL RESEARCH LAB., WASHINGTON, D. C.
Sound propagation through liquids in viscoelastic circular cylinders N83-10230
End-fire hybrid array antennas
[AD-A117414] N83-10332
Load numbers, solid earth tides, and liquid core dynamics
[AD-A117809] N83-10689
Lower hybrid RF current drive and electron-cyclotron heating on the Versator 2 Tokamak
[DE82-017127] N83-10934
Charge-capture experiments for plasma ions and neutral atoms
[DE82-014502] N83-10954
NAVAL SUBMARINE MEDICAL RESEARCH LAB., GROTON, CONN.
Depth perception with yellow goggles
[NSMRL-960] N83-10759
Filter stability, diagnostic consistency, and durability of the Farnsworth Lantern color vision test
[AD-A115052] N83-10769
The relationship of visual evoked potential asymmetries to the performance of sonar operators
[NSMRL-957] N83-10776
NAVAL SURFACE WEAPONS CENTER, WHITE OAK, MD.
EDESS: An electromagnetically-driven explosive-shock simulator N83-10245
A finite element model for failure initiation in shock loaded structural materials N83-10252
The bend-buckling of a ring-stiffened cylindrical shell due to whipping excitations N83-10263
NAVAL UNDERWATER SYSTEMS CENTER, NEW LONDON, CONN.
Media-structure interaction computations employing frequency dependent mesh sizes with the finite element method N83-10229
NEBRASKA UNIV., LINCOLN.
Satellite observations of variations in Northern Hemisphere seasonal snow cover
[PB82-196668] N83-10734
NETHERLANDS ORGANIZATION FOR APPLIED SCIENTIFIC RESEARCH TNO, DELFT.
Turbulence effects on high Reynolds number flow past circular cylinders
[PB82-176314] N83-10402
NEVADA UNIV., RENO.
Assessment of active faults for maximum credible earthquakes of the southern California-northern Baja region
[DE82-016327] N83-10699
NEW HAMPSHIRE UNIV., DURHAM.
An investigation of the effect of aggregate on concrete compressible strength
[PB82-212457] N83-10291
NEW MEXICO UNIV., ALBUQUERQUE.
A study of the in-situ indirect freezing process, volume 2
[PB82-200742] N83-10148
A study of the vacuum freezing high pressure ice-melting process, volume 1
[PB82-200734] N83-10149
Conservatism in least favorable response analysis and testing N83-10241
Study of the photovoltaic effect in thin film barium titanate
[NASA-CR-169435] N83-10567
NEW YORK SEA GRANT INST., ALBANY.
Marine biomass: New York State species and site studies
[PB82-216136] N83-10755
NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY, ALBANY.
Landfill gas recovery: An analysis of results N83-10596
NEW YORK UNIV., NEW YORK.
High-resolution schemes for hyperbolic conservation laws
[NASA-CR-169381] N83-10856
NKF ENGINEERING ASSOCIATES, INC., VIENNA, VA.
An approach to the limitation and control of shipboard vibration N83-10217
A method for estimating the error induced by the Guyan Reduction N83-10256
NORTH CAROLINA STATE UNIV., RALEIGH.
The electrical properties of the anodic oxide/GaAs interface N83-10356
NORTH TEXAS STATE UNIV., DENTON.
Urban waste as a potential source for brick plants N83-10591
NORTHEASTERN UNIV., BOSTON, MASS.
Vacuum pumping properties of a high voltage 60 Hz crossed field discharge N83-10346
NORTHERN ENERGY CORP., BOSTON, MASS.
Small-scale waste-to-energy systems: A state-of-the-art report N83-10583
NORTHWESTERN UNIV., EVANSTON, ILL.
Bifurcation and stability of propagating oscillation flames N83-10129
High temperature grain boundary cavitation in oxide dispersed copper N83-10168
Ray methods for inverse problems of elastic wave scattering N83-10315
Some aspects of elastic bodies in contact N83-10439
Markov reliability models for repairable distributed systems N83-10839
Germ-Markov processes N83-10865

O

OAK RIDGE NATIONAL LAB., TENN.
Diffuse relectance infrared Fourier-Transform spectra of selected organic compounds
[DE82-015855] N83-10116
One dimensional multi-phase moving boundary problems with phases of different densities
[DE82-010324] N83-10395
ANFLOW: Characterization and development of an energy conserving wastewater treatment system N83-10585
Health effects of dielectric gases: Preliminary report
[DE82-019724] N83-10751
KWIC index for numerical algebra
[DE82-008144] N83-10790
GRAF11: X-Y graph generation library
[DE82-016320] N83-10813
Survey of FORTRAN subroutines suitable for solving stiff oscillatory ordinary differential equations
[DE82-007790] N83-10824
Portable software package for nonlinear partial differential equations
[DE82-013512] N83-10827
Interactive statistical-distribution-analysis program utilizing numerical and graphical methods
[DE82-013341] N83-10828
Curvilinear coordinates for magnetic confinement geometries
[DE82-019733] N83-10928
Anisotropy effects on curvature-driven flute instabilities in a hot-electron plasma
[DE82-019902] N83-10929
RAYS: A geometrical optics code for EBT
[DE82-013391] N83-10936
Rippling modes in the edge of a Tokamak plasma
[DE82-007724] N83-10940
Resistive MHD studies of high-beta Tokamak plasmas
[DE82-008101] N83-10942
Fusion reactor plasma-performance modeling: POPCON analysis
[DE82-016364] N83-10943
Unconventional heating experiments in EBT
[DE82-013373] N83-10948
Second-cyclotron-harmonic emission measurements on ISX-B
[DE82-009938] N83-10949
Faraday-rotation measurements in ISX-B
[DE82-011507] N83-10953
Temperature limit in ECH hot electron plasmas
[DE82-015820] N83-10956
Neutral-beam deposition in large, finite-beta noncircular Tokamak plasmas
[DE82-008146] N83-10957
Permeability of salt-crystal interfaces to brine
[DE82-016580] N83-10968
OCCIDENTAL RESEARCH CORP., IRVINE, CALIF.
Study of ion beam-initiated inertial-confinement fusion
[DE82-013935] N83-10931
OCEAN DATA SYSTEMS, INC., MONTEREY, CALIF.
SEASAT-A SASS wind processing
[NASA-CR-169433] N83-10473
OFFICE OF TECHNOLOGY ASSESSMENT, WASHINGTON, D.C.
Airport and air traffic control system
[PB82-207606] N83-10033
Report to the Congress for 1981
[PB82-202862] N83-10994
OHIO STATE UNIV., COLUMBUS.
The Comstar D/3 gain degradation experiment
[NASA-CR-169442] N83-10320
Analysis of airborne antenna patterns
[NASA-CR-169448] N83-10323
A generalized method for determining radiation patterns of aperture antennas and its application to reflector antennas
[NASA-CR-169449] N83-10324
OIL TECHNOLOGISTS ASSOCIATION OF INDIA.
National Seminar on Current Advances in the Technology of Oils and Allied Product
[PB82-218124] N83-10201
OKLAHOMA UNIV., NORMAN.
Equation of state study for polar fluids
[PB82-214388] N83-10157
OLD DOMINION UNIV., NORFOLK, VA.
Attitude and vibration control of a large flexible space-based antenna
[NASA-CR-165979] N83-10110
Fitting multidimensional splines using statistical variable selection techniques
[NASA-CR-169363] N83-10867
Modeling of thin film GaAs growth
[NASA-CR-169366] N83-10963
OREGON INST. OF TECH., KLAMATH FALLS.
Community heat-pump system, Klamath County, Oregon
[DE82-015106] N83-10600
OREGON UNIV., EUGENE.
Synchrotron radiation to be used to generate holographic X-ray gratings
[DE82-008354] N83-10408

P

PACIFIC MISSILE TEST CENTER, POINT MUGU, CALIF.
Random impact vibration testor N83-10234
Parameters for design of reverberant acoustic chambers for testing air-carried missiles N83-10235
PACIFIC NORTHWEST LAB., RICHLAND, WASH.
Electroless nickel and ion-plated protective coatings for silvered glass mirrors
[DE82-015034] N83-10177
Effect of exposing two commercial manufacturers second-surface silver/glass mirrors to elevated-temperature, mechanical loading, and high-humidity environments
[DE82-013274] N83-10609
Diagnostics for multiple-regression problems
[DE82-013629] N83-10795
PACIFICA TECHNOLOGY, SAN DIEGO, CALIF.
An evaluation of: Doubly Asymptotic Approximation; staggered solution schemes; USA-STAGS N83-10228
PALOMAR OBSERVATORY, PASADENA, CALIF.
Infrared properties of serendipitous X-ray quasars
[NASA-CR-169454] N83-10995
Secondary standard stars for absolute spectrophotometry N83-11000
Infrared/optical energy distributions of high redshifted quasars
[NASA-CR-169436] N83-11001
PAWA, INC., DALLAS, TEX.
Experiences in transportation system management
[PB82-181322] N83-10303
PCR, INC., GAINESVILLE, FLA.
Synthesis of perfluorinated polyethers
[NASA-CR-166409] N83-10195
PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
Analysis of energy-absorbing shock mounts N83-10246
Investigation into bias errors of the two-microphone cross-spectral method to measure acoustic intensity
[AD-A117767] N83-10886
PENNSYLVANIA UNIV., PHILADELPHIA.
The effects of gaseous environments on the mechanical failure of polyethylene pipe materials N83-10205
Research possibilities? No! Needs for research to make PV solar energy utilization broadly competitive N83-10517
Cell and module formation research area N83-10522
PHOTOWATT INTERNATIONAL, INC., TEMPE, ARIZ.
Cell and module formation research area N83-10522
PHYSICAL RESEARCH LAB., AHMEDABAD (INDIA).
Numerical solution of linear parabolic partial differential equation with infinite range for space variable
[PB82-188905] N83-10864
PIDC-ENERGY DEVELOPMENT CORP., PHILADELPHIA, PA.
The feasibility of refuse-fired energy generation in Philadelphia, Pennsylvania N83-10587
PITTSBURGH MINING TECHNOLOGY CENTER, PA.
Fossil-energy
[DE82-018269] N83-10570

PLAGMAN GROUP, INC., NEW YORK, N.Y.
Entity types and relationships (for a data dictionary system)
[PB82-203688] N83-10836
Interactive language characteristics for a data dictionary system
[PB82-203696] N83-10837
POLYTECHNIC OF CENTRAL LONDON (ENGLAND).
An improvement to Shaikh's method for the torsional vibration analysis of branched systems N83-10254
POWER KINETICS, INC., TROY, N.Y.
The PKI collector N83-10528
PRATT AND WHITNEY AIRCRAFT GROUP, EAST HARTFORD, CONN.
Development of advanced high-temperature heat flux sensors
[NASA-CR-165618] N83-10044
PRATT AND WHITNEY AIRCRAFT GROUP, WEST PALM BEACH, FLA.
Augmentor stability management program user's manual
[AD-A117749] N83-10138
PREUSSAG A.G., ERDOEL UND ERDGAS, HANNOVER (WEST GERMANY).
Inverse modeling system for analysis of seismic interfaces: INMOD
[BMFT-FB-T-82-063] N83-10704
PRINCETON UNIV., N. J.
Low noise computationally efficient methods in digital signal processing N83-10318
Nonlocal effects of crack curving
[AD-A118285] N83-10450
The theory of concentrated Fisher-von-Mises distributions
[AD-A117514] N83-10871
Large sample theory of the Fisher-von-Mises distribution
[AD-A117515] N83-10872
A renormalized theory of drift wave turbulence in sheared magnetic fields N83-10924
Measurements of fusion reactions from a Tokamak plasma N83-10926
PSE AND G RESEARCH CORP., NEWARK, N.J.
Sewage sludge as a supplementary utility boiler fuel N83-10590
PUERTO RICO UNIV., MAYAGUEZ.
Fluid dynamic and thermodynamic analysis of a model pertaining to cryogenic fluid management in low gravity environments for a system with dynamically induced settling
[NASA-CR-167736] N83-10091
PURDUE UNIV., LAFAYETTE, IND.
Fault diagnosis of nonlinear analog circuit. Volume 2: A multifrequency method for soft failure analysis
[AD-A117568] N83-10358
Use of spectral data to estimate the relationship between soil moisture tensions and their corresponding reflectance
[PB82-224528] N83-10712
Multi attribute and multiple criteria approaches for determining Bayesian acceptance plans in quality control and auditing
[PB82-203100] N83-10974

Q

QED CORP., ANN ARBOR, MICH.
Inductive heating of spent granular activated carbon
[PB82-218603] N83-10123

R

RANGE COMMANDERS COUNCIL, WHITE SANDS MISSILE RANGE, N. MEX.
Software Engineering, 7th Seminar
[AD-A117995] N83-10811
RAYTHEON CO., BEDFORD, MASS.
Power conditioning subsystem design
[AD-A117736] N83-10569
RCA ASTRO-ELECTRONICS DIV., PRINCETON, N. J.
Spacecraft modal testing using systematic multi-shakers sine-dwell testing techniques N83-10236
REIMS UNIV., FRANCE.
Utilization of the mathematical theory of communication in information sciences
[REPT-1982-ST-133] N83-10340
RENSSELAER POLYTECHNIC INST., TROY, N. Y.
New higher-order boundary-layer equations for laminar and turbulent flow past axisymmetric bodies
[AD-A117806] N83-10392
Study of biofouling and its control in SRP cooling water systems
[DE82-016299] N83-10752
Neutron attenuation in the laser ducts of an inertial-confinement fusion reactor
[DE82-007195] N83-10947
RESEARCH INST. OF NATIONAL DEFENCE, STOCKHOLM (SWEDEN).
Running hot water: A systems approach to energy conservation
[FOA-C-10202-M2] N83-10628
A suggested message structure standard for GILT
[FOA-C-10199-M6] N83-10835
A numerical investigation of some quadratic polynomials containing a high density of primes, part 1
[FOA-C-10195-M8] N83-10862
REXNORD, INC., MILWAUKEE, WIS.
Evaluation of secondary environmental impacts of urban runoff pollution control
[PB82-230319] N83-10662
RHEINISCHE BRAUNKOHLENWERKE A.G., COLOGNE (WEST GERMANY).
Phototype plant for Nuclear Process Heat (NPH), reference phase. R and D work on Hydrogenated Coal Gasification (HCG). Further operation of semi-industrial plant for hydrogenated coal gasification
[BMFT-FB-T-82-098] N83-10625
RHODE ISLAND UNIV., KINGSTON.
The ecology of New England high salt marshes: A community profile
[PB82-217118] N83-10658
A simple plutometer for precise determination of dissolved oxygen concentration by the Winkler method with recommendations for improving respiration rate measurements in aquatic organisms
[PB82-181843] N83-10757
General methods to enable robots with vision to acquire, orient and transport workpieces
[PB82-202540] N83-10788
RHODE ISLAND UNIV., NARRAGANSETT.
Remote sensing, a tool for managing the marine environment: Eight case studies
[PB82-220864] N83-10483
ROCHESTER UNIV., N. Y.
Exploiting spatial and structural locality in geometric modelling
[PB82-212937] N83-10863
ROCKETDYNE, CANOGA PARK, CALIF.
Acoustic-emission monitoring of steam turbines
[DE82-904663] N83-10887
ROCKLAND COUNTY DRAINAGE AGENCY, N.Y.
Evaluation of rainfall-runoff data network, Rockland County, New York
[PB82-204058] N83-10720
ROCKWELL INTERNATIONAL CORP., GOLDEN, COLO.
Photochemical reactions in plutonium-nitric acid solutions
[DE82-005852] N83-10141
ROCKWELL INTERNATIONAL CORP., RICHLAND, WASH.
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703
ROSS (BERND) ASSOCIATES, SAN DIEGO, CALIF.
Cell and module formation research area N83-10522
ROYAL AIRCRAFT ESTABLISHMENT, FARNBOROUGH (ENGLAND).
Some measurements of wing buffeting on a flutter model of a typical strike aircraft
[RAE-TR-82007] N83-10052
A comparison of analytical techniques for predicting stability boundaries for some types of aerodynamic or cross-coupling nonlinearities N83-10071
Analysis of subcritical response measurements from aircraft flutter tests N83-10269
The numerical computation of three-dimensional turbulent boundary layers
[RAE-TM-AERO-1945] N83-10390
Calculations of asymmetric separated flow past circular cones at large angles of incidence
[RAE-TM-AERO-1949] N83-10391
ROYAL AUSTRALIAN AIR FORCE, EDINBURGH.
Evaluation of new Iroquois torquemeter PN 73-30-1
[AD-A117747] N83-10042
ROYAL NETHERLANDS AIR FORCE, THE HAGUE.
Effect of control system delays on fighter flying qualities N83-10073
RUHRKOHLE A.G., ESSEN (WEST GERMANY).
Development, construction, and experimental operation of an improved chainless haulage system for drum-shearer loaders
[BMFT-FB-T-82-102] N83-10428
Improved roadheading by dinting behind the face line to full section
[BMFT-FB-T-82-087] N83-10478
Pneumatic stowing with lateral discharge in coal faces with thick seams
[BMFT-FB-T-82-074] N83-10617

S

SAARBERG-HOELTER-UMWELTTECHNIK G.M.B.H., SAARBRUECKEN (WEST GERMANY).
Reconstruction and testing of the flue gas desulfurizing plant: Weiher 2
[BMFT-FB-T-82-108] N83-10652
SAN DIEGO STATE UNIV., CALIF.
The ecology of Southern California coastal salt marshes: A community profile
[PB82-205717] N83-10655
SANDERS ASSOCIATES, INC., NASHUA, N. H.
Ceramic high temperature receiver design and tests N83-10544
SANDIA LABS., ALBUQUERQUE, N. MEX.
Program to predict performance of a gas gun
[DE82-007644] N83-10088
Quasielastic light scattering from dilute and semidilute polymer solutions
[DE82-016806] N83-10197
Feasibility study for the surface impulse loading of structures using mild detonating fuze N83-10248
A theory for the calculation of explosive deposition profiles from the spray painting of light initiated explosive N83-10249
An improved recursive formula for calculating shock response spectra N83-10251
Proceedings of a Symposium on High Energy Density Capacitors and Dielectric Materials
[PB82-197344] N83-10373
WONDY V: A one-dimensional finite-difference wave-propagation code
[DE82-019807] N83-10396
Ion-trajectory simulations for a proposed time-of-flight mass spectrometer
[DE82-015493] N83-10409
Water release and mechanical failure in heated geologic salt
[DE82-012054] N83-10476
Central-station applications: System and subsystem research activities N83-10511
Results of testing a development module of the second-generation E-systems concentrating photovoltaic-thermal module
[DE82-015671] N83-10598
Aeroelastic stability analysis of a Darrieus wind turbine
[DE82-017001] N83-10603
Solar hemispherical reflectometer modification for second-surface mirror measurement
[DE82-016913] N83-10610
Seafloor Earthquake Measurement System. Volume 1. Overview and physical description
[DE82-010382] N83-10696
Recommendations for color vision testing and criteria for its implementation at Sandia National Laboratories
[DE82-019826] N83-10772
AGS-880 menu system user guide
[DE82-019955] N83-10793
SLAVE: A package of enhancements for the VAX/VMS EDT text editor
[DE82-019827] N83-10814
Matrix model of digital systems and its use in automatic test generation
[DE82-017640] N83-10816
Functional specification of the Sandia Virtual Device Interface (SVDI)
[DE82-014522] N83-10818
Improvements in CSQII: An improved numerical convection algorithm
[DE82-014264] N83-10820
An iterative algorithm to produce a positive definite correlation matrix from an approximate correlation matrix (with a program users guide)
[DE82-017351] N83-10825
Sparse linear programming subprogram
[DE82-011783] N83-10826
Time-sharing comparisons of several computers
[DE82-014514] N83-10841
What is stiffness?
[DE82-017639] N83-10854
Correlation and moment properties relating numerical integration and stochastic integrals
[DE82-016088] N83-10855
ARTOO: An automatically rezoning two-dimensional Lagrangian finite difference wavecode
[DE82-006997] N83-10857
Should the extrapolated midpoint rule be smoothed
[DE82-008488] N83-10858
Conditioning of matrices arising in the solution of stiff ODEs
[DE82-017641] N83-10878
Response of heavily shielded plastic scintillator: Photomultiplier combinations to nanosecond neutron pulses
[DE82-001096] N83-10889

Electron bremsstrahlung angular-distribution fits for atomic numbers 1 or = to Z or = to 92 and incident-electron energies 1 kev or = to T or = to 500 keV
[DE82-013388] N83-10890
High-powered pulsed-ion-beam acceleration and transport
[DE82-006879] N83-10894
Electron energy and charge albedos: Calorimetric measurement vs Monte Carlo theory
[DE82-006870] N83-10896
Description of the SNLA Automated Design Data System (ADDS)
[DE82-018347] N83-10982

SANDIA LABS., LIVERMORE, CALIF.
Designing the manifold piping for parabolic-trough-collector fields
[DE82-015998] N83-10599
SDL: Sandia structural design language. A user's manual
[DE82-013524] N83-10817

SANTA CLARA UNIV., CALIF.
A graph theoretic algorithm for hierarchial decomposition of dynamic systems
[DE82-013224] N83-10815

SATTLEGER INGENIEURBUERO FUER ANGEWANDTE GEOPHYSIK, MEPPEN (WEST GERMANY).
Inverse modeling system for analysis of seismic interfaces: INMOD
[BMFT-FB-T-82-063] N83-10704

SCHAEFER (ARNOLD) G.M.B.H., SAARWELLINGEN (WEST GERMANY).
Dry processing of power plant coal rich in inerts
[BMFT-FB-T-82-101] N83-10631

SCHMIDT REUTER ENGINEERING CONSULTING CO., COLOGNE (WEST GERMANY).
Conserving energy by improving the quality of the air purifying and air conditioning systems
[BMFT-FB-T-82-067] N83-10651

SCHOTT GLASWERKE, MAINZ (WEST GERMANY).
Development of large scale production methods for components of solar energy collection. Transparent glass covers and their connection to the collector system
[BMFT-FB-T-82-083] N83-10622

SCIENCE APPLICATIONS, INC., BOULDER, COLO.
Instabilities driven by the parallel variation of the electrostatic potential in tandems
[DE82-018409] N83-10941
Radial transport, end loss, and ambipolarity in tandem mirrors
[DE82-019546] N83-10955

SCIENCE COUNCIL OF JAPAN, TOKYO.
Space research in Japan, 1982 N83-11013

SCIENCE RESEARCH COUNCIL, CHILTON (ENGLAND).
SERC stabilized balloon platform Mk 1A Gimbal attachment module structural test
[PB82-208521] N83-10038
The connectivity of polymer networks by neutron scattering and a statistical theory of hard rod neumatic fluids
[PB82-208554] N83-10202
The use of the computer code PE2D in the electrostatic modelling of an electron beam generator vacuum diode interface
[PB82-174384] N83-10375

SCS ENGINEERS, COVINGTON, KY.
Demonstration of landfill gas enhancement techniques in landfill simulators N83-10594

SECORD (NELSON W.), BRIGHTON, MICH.
WECS-load controlled pitch-variable load conversion to heat
[DE82-014683] N83-10602

SEMIX, INC., GAITHERSBURG, MD.
Large-area silicon sheet task N83-10520

SHEFFIELD UNIV. (ENGLAND).
Self-tuning multi-step prediction of strength index in an iron-ore sintering process
[RR-183] N83-10178
Improved speed control law for a sinter strand process
[RR-184] N83-10179
Mode analysis of a tubular structure of coupled non-linear oscillators for small-intestinal modelling
[RR-186] N83-10753
Mode analysis of a tubular structure of coupled fifth-power non-linear oscillators for large-intestinal modelling
[RR-187] N83-10754
Utilisation of Perkin-Elmer operating system features to optimise programming efficiency
[RR-180] N83-10833
Efficient FORTRAN programming practice
[RR-182] N83-10834
Robust stability of Smith predictor controllers for time-delay systems
[RR-179] N83-10852
Controllability, optimal control and receding horizon control of distributed multipass processes
[RR-181] N83-10853

SHOCK AND VIBRATION INFORMATION CENTER (DEFENSE), WASHINGTON, D. C.
The Shock and Vibration Bulletin. Part 1: Keynote address, invited papers, damping and isolation, fluid-structure interaction
[AD-D432836] N83-10216
The Shock and Vibration Bulletin. Part 2: Environmental testing, shock testing, shock analysis
[AD-D432830] N83-10231
The Shock and Vibration Bulletin. Part 3: Analytical methods, dynamic analysis, vehicle systems
[AD-D432842] N83-10253
The Shock and Vibration Digest, volume 14, no. 8
[AD-A119004] N83-10433

SIEMENS A.G., BERLIN (WEST GERMANY).
Fundamental research into high voltages for further development of electric power distribution systems
[BMFT-FB-T-82-064] N83-10368

SIEMENS A.G., MUNICH (WEST GERMANY).
Introduction of an electron beam maskprinter system for LSI maskmaking
[BMFT-FB-T-82-110] N83-10371

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, PARIS (FRANCE).
Antitank missiles night firing from Aerospatiale helicopters
[SNIAS-822-320-101] N83-10102

SOCIETE NATIONALE INDUSTRIELLE AEROSPATIALE, TOULOUSE (FRANCE).
An example of longitudinal and transversal oscillation coupling: The Epsilon aircraft cork screw N83-10074
Analyzing the role of closed loop systems for a subsonic aircraft with reduced longitudinal stability N83-10076

SOLAR ENERGETICS, INC., WILMINGTON, DEL.
Geothermal energy market study on the Atlantic Coastal Plain: Dover Air Force Base geothermal energy evaluation
[PB82-183997] N83-10643

SOLAR STEAM, INC., FOX ISLAND, WASH.
An economic evaluation of solar energy N83-10549

SOLARELECTRONICS, INC., BELLINGHAM, MASS.
Flat-plate collector research area: Silicon material task N83-10519

SOLAREX CORP., ROCKVILLE, MD.
Cell and module formation research area N83-10522

SOUTHAMPTON UNIV. (ENGLAND).
Design of a horizontal liquid helium cryostate for refrigerating a flying superconducting magnet in a wind tunnel
[NASA-CR-165980] N83-10081
Multiband envelope techniques for the removal of reverberation and noise from speech signals
[ISVR-TR-119] N83-10338

SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT, BROOKSVILLE.
Sinkhole development resulting from ground-water withdrawal in the Tampa area, Florida
[PB82-185141] N83-10490

SOUTHWEST RESEARCH INST., SAN ANTONIO, TEX.
Low cost pavement marking materials based on plasticized sulfur
[PB82-217969] N83-10289

SPECTROLAB, INC., SYLMAR, CALIF.
PV history: Lessons for the future N83-10514
Environmental isolation task N83-10521
Cell and module formation research area N83-10522

SPIRE CORP., BEDFORD, MASS.
Cell and module formation research area N83-10522

SPRINGBORN LABS., INC., ENFIELD, CONN.
Environmental isolation task N83-10521

STANFORD UNIV., CALIF.
The economics of time shared computing: Congestion, user costs and capacity
[NASA-CR-169446] N83-10840
Research in space commercialization, technology transfer, and communications
[NASA-CR-169447] N83-10972

STATE UNIV. OF NEW YORK, BUFFALO.
Role of tin catalysts in the hydroliquefaction of coal N83-10131
Fracture locus studies in a polymethyl methacrylate-polystyrene system N83-10440
External ionization mechanisms for advanced thermionic converters N83-10496

STEVENS INST. OF TECH., HOBOKEN, N. J.
Research on the behavior of cascaded airfoils under conditions of high mean loading and flow unsteadiness
[AD-A117543] N83-10393

STUTTGART UNIV. (WEST GERMANY).
Criteria for an optimum laser detector system for Thomson scattering experiments on fusion plasmas
[IPF-82-4] N83-10422

SUNTECH, INC., MARCUS HOOK, PA.
An exploratory research and development program leading to specifications for aviation turbine fuel from whole crude shale oil. Part 4: Production of samples of military fuels from raw shale oils
[AD-A117526] N83-10211

SWEDISH COUNCIL FOR BUILDING RESEARCH, STOCKHOLM.
Testing of slipperiness: Forces applied to the floor and movements of the foot in walking and in slipping on the heel
[PB82-204108] N83-10787

SYDNEY UNIV. (AUSTRALIA).
Rapid exact inelastic biaxial bending analysis
[PB82-196650] N83-10455

SYSTECH CORP., XENIA, OHIO.
Conversion of municipal solid waste to energy, Jacksonville, Florida N83-10593

SYSTEMS TECHNOLOGY, INC., HAWTHORNE, CALIF.
Bandwidth: A criterion for highly augmented airplanes N83-10063

SYSTEMS TECHNOLOGY, INC., MOUNTAIN VIEW, CALIF.
An analysis of airline landing flare data based on flight and training simulator measurements
[NASA-CR-166404] N83-10047

T

TECHNICAL RESEARCH CENTRE OF FINLAND, ESPOO.
A thermal desorption cold-trap unit for gaschromatographic analysis of gaseous organic pollutants
[PB82-206368] N83-10152
The measurement of the cleavage fracture strength by means of an instrument impact test
[PB82-206806] N83-10183
Intercommunication between open networks
[PB82-205188] N83-10843
Appraisal of the Comax conception
[PB82-204413] N83-10976

TECHNION - ISRAEL INST. OF TECH., HAIFA.
Predictor symbology in computer-generated pictorial displays
[NASA-CR-169441] N83-10803

TECHNISCHE HOCHSCHULE, AACHEN (WEST GERMANY).
Desulfurization of coal by means of the Batac-jig
[BMFT-FB-T-82-100] N83-10145
Pressure-swinging underground gasification. Theoretical and experimental investigations of gasification, phase 2
[BMFT-FB-T-82-066] N83-10615

TECHNISCHE HOCHSCHULE, DARMSTADT (WEST GERMANY).
Determination of climatological parameters of global radiation and direct solar radiation for horizontal, not horizontal, fixed and normal incident radiation absorber
[BMFT-FB-T-82-070] N83-10718

TECHNISCHE HOGESCHOOL, DELFT (NETHERLANDS).
Digital calculation of the propagation in time of the aircraft gust response covariance matrix
[VTH-LR-266] N83-10053
A short note on the compressive behaviour of aramid fibre reinforced plastics
[VTH-LR-341] N83-10122
Notes on the unsteady rectilinear motion of a perfect gas. Part 5: A nonuniformly traveling shock wave in an LMS gas
[VTH-LR-328] N83-10398
Notes on the unsteady rectilinear motion of a perfect gas. Part 6: On a transformation of Staniukovich and its generalization
[VTH-LR-329] N83-10399
Stresses around pin-loaded holes in elastically orthotropic plates with arbitrary load direction
[VTH-LR-333] N83-10452
The stress distribution around an infinite row of circular holes in an orthotropic plate
[VTH-LR-340] N83-10453

TECHNISCHE UNIV., BERLIN (WEST GERMANY).
Investigation of extracts by fluidized bed extraction
[BMFT-FB-T-82-068] N83-10142

TECHNISCHE UNIVERSITAET, BRUNSWICK (WEST GERMANY).
Computerized simulation of the dynamic response of a coal-fired power plant with pressurized fluidized bed
[BMFT-FB-T-82-094] N83-10629

TECHNISCHE UNIVERSITAET, CLAUSTHAL-ZELLERFELD (WEST GERMANY).
Development of new and improvement of existing core recovery methods
[BMFT-FB-T-82-091] N83-10705

TECHNOLOGY, INC., HOUSTON, TEX.
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 2: Detailed program descriptions, listings, examples and hardware specifications
[NASA-CR-167737] N83-10760
Special report on the data collection programs for the ground based nitrogen washout experiment. Volume 1: User's guide
[NASA-CR-167739] N83-10804
TECHNOLOGY SERVICE CORP., SILVER SPRING, MD.
Ultralow sidelobe planar near field measurement study
[AD-A117744] N83-10331
TENNESSEE TECHNOLOGICAL UNIV., COOKEVILLE.
Critical speeds of multi-throw crankshafts using spatial line element method N83-10257
TENNESSEE UNIV., KNOXVILLE.
Experiments on continuum electron capture in atomic hydrogen and collisional interactions of trapped ions
[DE82-013939] N83-10891
TENNESSEE VALLEY AUTHORITY, MUSCLE SHOALS, ALA.
Biomass fuels update. TVAs biomass fuels program
[DE82-904990] N83-10613
TETRA TECH, INC., PASADENA, CALIF.
Technical and economical assessment on Tethered Wind-Energy Systems (TWES)
[DE82-017120] N83-10604
TEXAS A&M UNIV., COLLEGE STATION.
Subsurface radar applications in the Delaware Basin
[DE82-007147] N83-10695
TEXAS TECHNOLOGICAL UNIV., LUBBOCK.
Laboratory modeling and analysis of aircraft-lightning interactions
[NASA-CR-169455] N83-10023
TEXAS UNIV., AUSTIN.
Properties of Pt supported on oxides of titanium
[AD-A117892] N83-10139
Friction-type bolted connections with A588 weathering steel
[PB82-203183] N83-10292
Vacuum magnetic fields with dense flux surfaces
[DE82-014989] N83-10881
Long-time correlations of periodic, area-preserving maps
[DE82-016022] N83-10946
TEXTRON BELL HELICOPTER, FORT WORTH, TEX.
Investigation of advanced navigation and guidance system concepts for all-weather rotorcraft operations
[NASA-CR-166274] N83-10029
THOMAS ELECTRONICS INC., WAYNE N. J.
Manufacturing Methods and Technology (MM&T) specifications for miniature cathode ray tube
[AD-A117532] N83-10360
TOKAI UNIV., KANAGAWA (JAPAN).
Observation on Stark-shifts of Lyman Alpha lines of low-Z ions in laser-produced plasmas
[IPPJ-603] N83-10916
TOKYO INST. OF TECH. (JAPAN).
Stability of propagating long ion ring layer
[IPPJ-604] N83-10915
TORONTO UNIV., DOWNSVIEW (ONTARIO).
The landing approach in variable winds: Curved glidepath geometries and worst-case wind modeling
[UTIAS-254] N83-10028
TORONTO UNIV. (ONTARIO).
Effect of a damper on the wind-induced oscillations of a tall mast
[UTIAS-257] N83-10273
Jet response to pure tone excitation
[UTIAS-TN-232] N83-10381
Nonlinear scattering of ultrasound by bubbles: Numerical and experimental investigations with application to their detection
[UTIAS-261] N83-10882
The plasma current multiplier
[UTIAS-256] N83-10923
TOTAL ENVIRONMENTAL ACTION, INC., HARRISVILLE, N.H.
Study of photovoltaic residential retrofits. Volume 1: Executive summary
[DE82-015793] N83-10605
TRANSPORTATION RESEARCH BOARD, WASHINGTON, D.C.
Pavement roughness and skid properties
[PB82-212309] N83-10295
The Application of Traffic Simulation Models
[PB82-207226] N83-10992
TRANSPORTATION SYSTEMS CENTER, CAMBRIDGE, MASS.
Airport landside. Volume 1. Planning guide
[AD-A117599] N83-10083
Airport landside. Volume 2. The Airport Landside Simulation Model (ALSIM) description and users guide
[AD-A117600] N83-10084
Airport landside. Volume 3. ALSIM calibration and validation
[AD-A117601] N83-10085
Airport landside. Volume 4. Appendix A. ALSIM AUXILIARY and MAIN programs
[AD-A117602] N83-10086
Airport landside. Volume 5. Appendix B. ALSIM subroutines
[AD-A117603] N83-10087
TROCHOID POWER CORP., EDEN PRAIRIE, MINN.
Positive displacement rotary vapor compressor for vapor compression
[PB82-227620] N83-10429
TRW DEFENSE AND SPACE SYSTEMS GROUP, REDONDO BEACH, CALIF.
Pulsed inductive thruster development (Advanced electric propulsion technology: High thrust). Volume 2. Supplement
[AD-A117797] N83-10114
TRW, INC., REDONDO BEACH, CALIF.
Deep discharge reconditioning and shorted storage of batteries
[NASA-CR-167953] N83-10502
VMOMS: A computer code for finding moment solutions to the Grad-Shafranov equation
[DE82-008142] N83-10807
TUFTS UNIV., MEDFORD, MASS.
The response spectrum method of solution for displacement excitation N83-10250

U

UNION CARBIDE CORP., OAK RIDGE, TENN.
Data base simulator
[DE82-013342] N83-10821
UNION CARBIDE CORP., TONAWANDA, N.Y.
Flat-plate collector research area: Silicon material task N83-10519
UNITED TECHNOLOGIES CORP., SOUTH WINDSOR, CONN.
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] N83-10556
On the 40kW test power plant modification and development, phase 2
[PB82-216102] N83-10637
UNITED TECHNOLOGIES RESEARCH CENTER, EAST HARTFORD, CONN.
Analysis of airfoil leading edge separation bubbles
[NASA-CR-165935] N83-10018
Combustion of coal gas fuels in a staged combustor
[NASA-TM-82987] N83-10556
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
Crustal and upper mantle velocity and Q of mainland China
[AD-A117030] N83-10687
Studies of bistable optical devices
[AD-A117755] N83-10905
URS/BLUME (JOHN A.) AND ASSOCIATES, SAN FRANCISCO, CALIF.
Geology of the Las Vegas area
[DE82-015871] N83-10692
UTAH UNIV., SALT LAKE CITY.
Catalytic hydrodeoxygenation of coal-derived liquids and related oxygen-containing compounds N83-10132

V

VALVO G.M.B.H., HAMBURG (WEST GERMANY).
Application of ion implantation in the manufacturing of monolithic bipolar analogue integrated circuits
[PB82-214067] N83-10374
VEREINIGTE ELEKTRIZITAETSWERKE WESTFALEN A.G., DORTMUND (WEST GERMANY).
Determination of friction coefficients on several distant heat pipe sections with different sliding partners
[BMFT-FB-T-82-095] N83-10397
VEREINIGTE KESSELWERKE DUESSELDORF (WEST GERMANY).
Technical study on the possibilities of oil shale combustion in a fluidized bed furnace including cost estimates for a plant to be built
[BMFT-FB-T-82-085] N83-10623
VIRGINIA HIGHWAY AND TRANSPORTATION RESEARCH COUNCIL, CHARLOTTESVILLE.
Investigation of concrete mixtures incorporating hollow plastic microspheres
[PB82-198193] N83-10125
Effective field use of high range water reduced concrete
[PB82-201609] N83-10293
VIRGINIA POLYTECHNIC INST. AND STATE UNIV., BLACKSBURG.
A critical study of the role of the surface oxide layer in titanium bonding
[NASA-CR-169457] N83-10174
Surface analysis in composite bonding
[NASA-CR-169456] N83-10196
Turbulent boundary layer over solid and porous surfaces with small roughness
[NASA-CR-3612] N83-10383
Microbiological studies towards optimization of methane from marine plant biomass
[PB82-214362] N83-10756
VIRGINIA UNIV., CHARLOTTESVILLE.
Effective dynamic reanalysis of large structures N83-10259

W

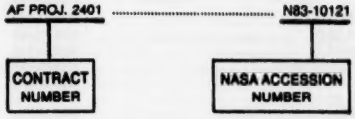
WASHINGTON STATE UNIV., PULLMAN.
Meteorology and air quality patterns in St. Louis RAPS Program, upper level analyses
[PB82-217522] N83-10729
WASHINGTON UNIV., SEATTLE.
Crustal structure near the Iceland Research Drilling Project borehole from a seismic refraction survey
[AD-A115205] N83-10688
IUE observations of Herbig-Haro and related objects
[NASA-CR-169367] N83-10997
WASTE MANAGEMENT, INC., POMPANO BEACH, FLA.
Solid waste to methane gas (RefCOM) N83-10584
WATER RESOURCES COUNCIL, WASHINGTON, D.C.
Groundwater management: Discussion of issues. Report of the Interstate Groundwater Task Force prepared by the US Water Resources Council
[PB82-181637] N83-10666
WAYNE STATE UNIV., DETROIT, MICH.
Sensitivities of internal combustion automotive engines to variations in fuel properties
[PB82-194961] N83-10430
WED ENTERPRISES, GLENDALE, CALIF.
Water hyacinth wastewater treatment system N83-10586
WEIDLINGER ASSOCIATES, MENLO PARK, CALIF.
Response of hydrofoil strut-foil systems after impact with 'dead-head' logs N83-10264
WESTEC SERVICES, INC., SAN DIEGO, CALIF.
Remote Medical Diagnosis System (RMDS) Advanced Development Model (ADM) at-sea test results
[AD-A114374] N83-10768
WESTINGHOUSE ELECTRIC CORP., BALTIMORE, MD.
Myths and sacred cows in shock and vibration N83-10221
WESTINGHOUSE ELECTRIC CORP., PITTSBURGH, PA.
Large-area silicon sheet task N83-10520
Cell and module formation research area N83-10522
WESTINGHOUSE RESEARCH AND DEVELOPMENT CENTER, PITTSBURGH, PA.
Study of Guyan reduction of two degree of freedom systems N83-10255
Lateral dynamics of C4 missile N83-10268
WISCONSIN UNIV., MADISON.
Protection of large capacitor banks
[DE82-017353] N83-10366
Development of Egyptian instrumentation technology
[PB82-199845] N83-10411
Analysis of displacement and strain data for the determination of the in-situ deformability of rock masses
[DE82-012540] N83-10703
Lung metabolism, function, and morphology during hyperoxic and hyperbaric exposure
[AD-A117074] N83-10763
WYOMING UNIV., LARAMIE.
Software system for reducing PAM-2 data
[NASA-CR-169458] N83-10684

Y

YALE UNIV., NEW HAVEN, CONN.
Development of newer methods for the isolation and identification of certain components found in complex mixtures derived from energy sources and the determination of their toxicity via bioassay systems
[DE82-019043] N83-10140
In situ monitoring of electrochemical reactions by surface enhanced Raman scattering
[PB82-216128] N83-10150

CONTRACT NUMBER INDEX

Typical Contract Number Index Listing



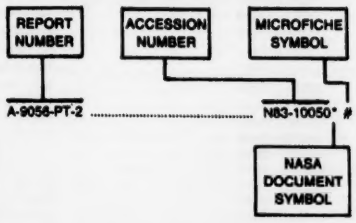
Listings in this index are arranged alphanumerically by contract number. Under each contract number the NASA accession numbers denoting documents that have been produced as a result of research done under that contract are arranged in ascending order. The NASA accession number denotes the number by which the citation is identified.

AF PROJ. 1A10 ..... N83-10686
AF PROJ. 2295 ..... N83-10098
AF PROJ. 2301 ..... N83-10927
AF PROJ. 2304 ..... N83-10392
AF PROJ. 2305 ..... N83-10904
N83-10905
AF PROJ. 2306 ..... N83-10966
AF PROJ. 2307 ..... N83-10020
AF PROJ. 2312 ..... N83-10763
AF PROJ. 2401 ..... N83-10121
AF PROJ. 2402 ..... N83-10810
AF PROJ. 2480 ..... N83-10211
AF PROJ. 2698 ..... N83-10098
AF PROJ. 3048 ..... N83-10210
AF PROJ. 3066 ..... N83-10046
N83-10138
AF PROJ. 3145 ..... N83-10569
AF PROJ. 3291 ..... N83-10687
AF PROJ. 5730 ..... N83-10114
AF PROJ. 8680 ..... N83-10325
AF-AFOSR-0057-79 ..... N83-10020
AF-AFOSR-0169-81 ..... N83-10904
AF-AFOSR-0187-81 ..... N83-10966
AF-AFOSR-0192-80 ..... N83-10392
AF-AFOSR-3497-78 ..... N83-10763
AF-AFOSR-3686-78 ..... N83-10905
ARPA ORDER 512 ..... N83-10686
ARPA ORDER 3089 ..... N83-10850
ARPA ORDER 3291 ..... N83-10687
ARPA ORDER 3655 ..... N83-10112
DA PROJ. 1L1-62120-AH-25 ..... N83-10334
DA PROJ. 1L1-62733-AH-20 ..... N83-10474
DA PROJ. 1L2-63102-D-071 ..... N83-10176
DA PROJ. 3E1-62777-A-878 ..... N83-10762
DAAG29-79-C-0158 ..... N83-10870
DAAG46-80-C-0027 ..... N83-10176
DAAK40-78-C-0251 ..... N83-10361
DAAK70-80-C-0086 ..... N83-10474
DAAK70-80-C-0168 ..... N83-10360
DE-AC01-76ET-12489 ..... N83-10606
DE-AC02-76ER-03077 ..... N83-10856
DE-AC02-76ET-52042 ..... N83-10880
DE-AC02-76ET-53016 ..... N83-10952
DE-AC02-76ET-53051 ..... N83-10366
DE-AC02-76EV-02958 ..... N83-10140
DE-AC02-77CH-00178 ..... N83-10364
N83-10601
N83-10604
DE-AC02-77ET-51010 ..... N83-10947
DE-AC02-78ET-51013 ..... N83-10365
N83-10932
N83-10933
N83-10934
N83-10939
N83-10944
N83-10950
DE-AC02-79EV-10095 ..... N83-10770
DE-AC03-76ET-53057 ..... N83-10941
N83-10955
DE-AC03-76SP-00098 ..... N83-10892
DE-AC03-77ET-11302 ..... N83-10637
DE-AC03-80CS-24330 ..... N83-10581
DE-AC04-76DP-00613 ..... N83-10335
DE-AC04-76DP-00789 ..... N83-10088
N83-10396
N83-10409
N83-10476
N83-10597
N83-10598
N83-10599
N83-10603
N83-10605
N83-10607
N83-10608
N83-10610
N83-10695
N83-10696
N83-10772
N83-10793
N83-10814
N83-10816
N83-10817
N83-10818
N83-10820
N83-10825
N83-10826
N83-10841
N83-10854
N83-10855
N83-10857
N83-10858
N83-10878
N83-10889
N83-10890
N83-10894
N83-10896
N83-10982
DE-AC04-76DP-03533 ..... N83-10141
DE-AC05-77ET-53044 ..... N83-10946
DE-AC06-76FF-02170 ..... N83-10830
DE-AC06-76RL-01830 ..... N83-10177
N83-10609
N83-10702
N83-10795
DE-AC06-77RL-01030 ..... N83-10703
DE-AC07-76ID-01570 ..... N83-10771
N83-10873
N83-10958
DE-AC08-78DP-40030 ..... N83-10394
DE-AC08-81DP-40138 ..... N83-10931
DE-AC08-81NV-10145 ..... N83-10692
DE-AC09-76SR-00001 ..... N83-10752
DE-AC21-78ET-10329 ..... N83-10212
DE-AI01-76ET-12548 ..... N83-10503
DE-AI01-76ET-20356 ..... N83-10505
N83-10553
DE-AI01-76ET-53002 ..... N83-10954
DE-AI01-77CS-51040 ..... N83-10991
DE-AI01-77CS-51044 ..... N83-10348
N83-10349
DE-AI01-77ET-10350 ..... N83-10208
DE-AI01-77ET-13111 ..... N83-10556
N83-10557
N83-10559
N83-10560
DE-AI01-79ET-27025 ..... N83-10640
N83-10643
DE-AI01-82ET-20342 ..... N83-10639
DE-AI08-78ET-44802 ..... N83-10701
DE-AL01-79ET-27025 ..... N83-10636
DE-AM04-80AL-13137 ..... N83-10551
DE-AS02-76ER-02390 ..... N83-10967
DE-AS02-76ET-52042 ..... N83-10880
DE-AS05-78ET-52025 ..... N83-10951
DE-AS05-79ER-10512 ..... N83-10891
DE-AT03-76ET-35301 ..... N83-10831
DE-AT03-76ET-51011 ..... N83-10908
DE-AT04-81AL-16228 ..... N83-10525
DE-AT06-76ER-70004 ..... N83-10408
DE-FG02-81R-510309 ..... N83-10602
DE-FG05-80ET-53088 ..... N83-10881
N83-10946
DE-FG06-79ET-17156 ..... N83-10600
DE-FG06-79ET-27256 ..... N83-10611
DEN3-32 ..... N83-10991
DEN3-59 ..... N83-10349
DEN3-64 ..... N83-10348
DEN3-149 ..... N83-10556
DEN3-212 ..... N83-10561
DI-BM-J0-205002 ..... N83-10180
DI-14-34-0001-0119 ..... N83-10660
DI-14-34-0001-1119 ..... N83-10660
DI-14-34-0001-8528 ..... N83-10148
N83-10149
DNA001-79-C-0208 ..... N83-10850
DOT-FA77WA-4019 ..... N83-10025
N83-10026
DOT-FH-11-9403 ..... N83-10306
DOT-FR-11-9450 ..... N83-10289
DTFH61-80-C-00177 ..... N83-10282
N83-10283
DTRS-57-80-P-80733 ..... N83-10430
E(49-18)-2555 ..... N83-10601
EDA-06-05-11007-10 ..... N83-10642
EG-77-C-01-4042 ..... N83-10364
N83-10601
N83-10604
EO-A01-78-00-3501 ..... N83-10089
N83-10090
EPA-GS-05S-01458 ..... N83-10414
EPA-GS-05S-10458 ..... N83-10415
EPA-R-804429 ..... N83-10412
EPA-R-806176010 ..... N83-10729
EPA-68-01-6188 ..... N83-10665
EPA-68-02-3058 ..... N83-10657
EPA-68-02-3701 ..... N83-10789
EPA-68-03-2574 ..... N83-10662
EPRI PROJ. 1266-14 ..... N83-10887
EPRI PROJ. 1511-1 ..... N83-10367
ESTEC-4581/81/NL-AK(SC) N83-10101
ET-78-C-01-3391 ..... N83-10075
EX-76-A-34-1010 ..... N83-10954
EX-76-A-36-1008 ..... N83-10636
EY-76-S-02-2780 ..... N83-10880
FAA PROJ. 184-32-130 ..... N83-10041
FH-11-8900 ..... N83-10292
FH-11-9295 ..... N83-10301
F04611-79-C-0058 ..... N83-10114
F19628-80-C-0002 ..... N83-10098
N83-10686
F19628-82-C-0001 ..... N83-10325
F30602-81-C-0180 ..... N83-10111
N83-10112
F33615-76-C-1002 ..... N83-10330
F33615-77-C-3084 ..... N83-10121
F33615-78-C-2024 ..... N83-10211
F33615-78-C-2072 ..... N83-10046
F33615-78-C-2080 ..... N83-10210
F33615-78-C-3615 ..... N83-10063
F33615-79-C-2059 ..... N83-10138
F33615-79-C-2079 ..... N83-10569
F33615-80-C-3403 ..... N83-10810
F33615-80-C-3604 ..... N83-10063
F49620-76-C-0010 ..... N83-10687
F49620-81-C-0021 ..... N83-10927
GEN. ATOMIC PROJ. 3344 ..... N83-10908
GRI-5014-361-0242 ..... N83-10156
GRI-5014-361-0262 ..... N83-10161
GRI-5014-363-0196 ..... N83-10160
GRI-5080-321-0301 ..... N83-10151
GRI-5080-342-0389 ..... N83-10429
GRI-5080-345-0403 ..... N83-10290
GRI-5080-363-0376 ..... N83-10157
GRI-5080-363-0382 ..... N83-10205
GRI-5081-360-0453 ..... N83-10213
GS-05S-10458 ..... N83-10413
HR-20-5 ..... N83-10303
HUD-H-48-78 ..... N83-10400
JPL PROJ. 5101-216 ..... N83-10553
JPL PROJ. 5106-23 ..... N83-10551
JPL-955370 ..... N83-10473
MBB-R4000-2594R N83-10101
MF58524002 ..... N83-10784
MF58524023 ..... N83-10782
MO100PN001 ..... N83-10769
NAG1-28 ..... N83-10023
NAG1-95 ..... N83-10567

NAG1-102 ..... N83-10110
NAG1-119 ..... N83-10383
NAG1-148 ..... N83-10963
NAG1-223 ..... N83-10867
NAG1-224 ..... N83-10388
NAG1-248 ..... N83-10196
NAG1-252 ..... N83-10174
NAG2-139 ..... N83-10777
NAG3-50 ..... N83-10970
NAG3-299 ..... N83-10329
NAG5-19 ..... N83-10675
NAG5-45 ..... N83-10997
NAG5-134 ..... N83-10472
NASW-3204 ..... N83-10840
N83-10972
NASW-3281 ..... N83-10387
NASW-3302 ..... N83-10803
NASW-3387 ..... N83-11005
NASW-3393 ..... N83-10320
NASW-3503 ..... N83-11004
NASW-3514 ..... N83-10404
NASW-3522 ..... N83-10214
NASW-3541 ..... N83-10002
N83-10749
N83-11006
NAS1-10817 ..... N83-10047
NAS1-13681 ..... N83-10172
NAS1-14887 ..... N83-10441
NAS1-15749 ..... N83-10120
NAS1-16078 ..... N83-10562
NAS1-16312 ..... N83-10645
N83-10646
NAS1-16556 ..... N83-10379
NAS1-16585 ..... N83-10018
NAS2-8156 ..... N83-10195
NAS2-10021 ..... N83-10027
NAS2-10065 ..... N83-10119
NAS2-10743 ..... N83-10029
NAS3-21253 ..... N83-10502
NAS3-21291 ..... N83-10568
NAS3-22133 ..... N83-10044
NAS3-22543 ..... N83-10207
NAS7-100 ..... N83-10321
N83-10350
N83-10503
N83-10504
N83-10505
N83-10525
N83-10551
N83-10552
N83-10553
NAS8-30753 ..... N83-10995
NAS8-34381 ..... N83-10848
NAS9-14880 ..... N83-10760
N83-10804
NAS9-15779 ..... N83-10092
NAS9-16549 ..... N83-10091
NBS-80-SBCA-0528 ..... N83-10986
NB81-SBCA-0733 ..... N83-10836
N83-10837
NB81-SBCA-0735 ..... N83-10838
NCA2-0R525-101 ..... N83-10856
NGL-05-002-207 ..... N83-10995
NGR-11-001-009 ..... N83-10750
NGT-36-001-800 ..... N83-10970
NGT-36-001-801 ..... N83-10970
NIMH-1-R01-MH-31425 ..... N83-10778
NIMH-5-R01-MH-31425 ..... N83-10779
NOAA-03-8-A01-78-4312 ..... N83-10728
NR PROJ. 056-578 ..... N83-10139
NR PROJ. 094-391 ..... N83-10393
NR PROJ. 154-460 ..... N83-10778
N83-10779
NR PROJ. 277-291 ..... N83-10809
NRC-04-76-291 ..... N83-10710
NSF AST-77-27745 ..... N83-10995
NSF AST-80-17335 ..... N83-10995
NSF CEE-81-14091 ..... N83-10123
NSF DAR-78-17064 ..... N83-10863
NSF DAR-78-25359 ..... N83-10863
NSF DAR-78-27337 ..... N83-10788
NSF ECS-80-07103 ..... N83-10974
NSF ENG-76-23527 ..... N83-10880
NSF ENG-78-10442 ..... N83-10278
N83-10279
NSF ENG-79-04440 ..... N83-10160
NSF ENG-79-070947 ..... N83-10932
NSF ENV-79-05007 ..... N83-10721
NSF GJ-36392X N83-10840
NSF INT-79-11051 ..... N83-10411
NSF ISP-78-20518 ..... N83-10973
NSF IST-78-23251 ..... N83-10987
NSF IST-81-08350 ..... N83-10840
NSF PFR-78-22265 ..... N83-10287
NSF PFR-79-08257 ..... N83-10277
NSF PFR-79-08261 ..... N83-10278
N83-10279
NSF PFR-79-16572 ..... N83-10280
NSF PFR-80-06348 ..... N83-10708
NSF PRA-80-09552 ..... N83-10975
NSF-C-PFR78-19200 ..... N83-10274
N83-10281
NSG-1243 ..... N83-10648
NSG-1266 ..... N83-10388
NSG-1297 ..... N83-10448
N83-10449
NSG-1498 ..... N83-10323
N83-10324
NSG-1518 ..... N83-10684
NSG-2256 ..... N83-10380
NSG-7315 ..... N83-10680
NSG-7523 ..... N83-10081
N00014-75-C-0144 ..... N83-10075
N00014-75-C-0922 ..... N83-10139
N00014-76-C-0240 ..... N83-10450
N00014-78-C-0389 ..... N83-10688
N00014-79-C-0322 ..... N83-10871
N83-10872
N00014-79-C-0650 ..... N83-10809
N00014-79-C-0765 ..... N83-10393
N00014-81-C-2231 ..... N83-10137
N00014-81-C-2350 ..... N83-10739
N00014-81-K-0034 ..... N83-10778
N83-10779
N00014-81-K-0323 ..... N83-10358
N00014-82-C-0115 ..... N83-10331
N00024-79-C-6043 ..... N83-10886
N00024-81-C-5301 ..... N83-10636
N83-10643
N83-10710
N66001-78-C-0274 ..... N83-10768
OWRT PROJ. A-061-IND N83-10712
PROJ. M0933PN N83-10768
PR0330341 ..... N83-10689
RF PROJ. 4293 ..... N83-10695
RR03105330 ..... N83-10738
SG-NA79AA-D-00096 ..... N83-10483
W-31-109-ENG-38 ..... N83-10650
N83-10832
N83-10937
N83-10938
W-31-109-38-5830 ..... N83-10612
W-7405-ENG-26 ..... N83-10116
N83-10395
N83-10585
N83-10751
N83-10790
N83-10813
N83-10821
N83-10824
N83-10827
N83-10828
N83-10928
N83-10929
N83-10936
N83-10940
N83-10942
N83-10943
N83-10948
N83-10949
N83-10953
N83-10956
N83-10957
N83-10968
W-7405-ENG-36 ..... N83-10421
N83-10694
N83-10698
N83-10812
N83-10829
N83-10842
N83-10893
N83-10907
N83-10935
N83-10945
N83-10985
W-7405-ENG-48 ..... N83-10363
N83-10691
N83-10693
N83-10697
N83-10699
N83-10700
N83-10794
N83-10815
N83-10819
N83-10822
N83-10823
N83-10851
N83-10869
N83-10879
N83-10895
N83-10930
N83-10946
N83-10983
N83-10984
W-7405-ENG-82 ..... N83-10570
WF12131602 ..... N83-10332
146-40-15-07 ..... N83-10647
307-01-02-04 ..... N83-10407
505-31-53-06 ..... N83-10081
N83-10082
505-32-2B N83-10045
505-32-02 ..... N83-10885
505-32-03-06 ..... N83-10883
505-32-12 ..... N83-10389
505-32-32 ..... N83-10207
N83-10208
505-32-42 ..... N83-10425
505-32-82 ..... N83-10044
505-33-32 ..... N83-10118
505-33-33-06 ..... N83-10447
505-33-53-01 ..... N83-10035
505-33-63-03 ..... N83-10017
505-34-43-08 ..... N83-10806
505-41-33-01 ..... N83-10442
505-41-83-02 ..... N83-10034
505-42-21 ..... N83-10049
505-43-02 ..... N83-10019
505-43-23-04 ..... N83-10016
505-44-13-01 ..... N83-10024
506-53-1B N83-10171
506-53-12 ..... N83-10194
506-54-73-02 ..... N83-10110
506-55-13-01 ..... N83-10420
506-55-42 ..... N83-10554
N83-10555
N83-10962
506-55-52 ..... N83-10134
N83-10135
N83-10558
506-58-22 ..... N83-10322
512-52 ..... N83-10027
534-04-13-52 ..... N83-10803
776-42-61 ..... N83-10503
776-52-61 ..... N83-10553
776-81-23 ..... N83-10551
776-81-62 ..... N83-10525
778-14-10 ..... N83-10557
N83-10559
N83-10560
778-35-03 ..... N83-10991
778-36-06 ..... N83-10349
778-46-22 ..... N83-10568
985-15-32 ..... N83-10424

REPORT / ACCESSION NUMBER INDEX

Typical Report / Accession Number Index Listing



Listings in this index are arranged alphanumerically by report number. The NASA accession number denotes the number by which the citation is identified. An asterisk (*) indicates that the item is a NASA report. A pound sign (#) indicates that the item is available on microfiche.

A-9011 ..... N83-10048* #
A-9033 ..... N83-10051* #
A-9056-PT-1 ..... N83-10049* #
A-9056-PT-2 ..... N83-10050* #

ABK-TR-03 ..... N83-10274 #
ABK-TR-04 ..... N83-10281 #

AD-A114354 ..... N83-10738 #
AD-A114374 ..... N83-10768 #
AD-A114421 ..... N83-10782 #
AD-A115021 ..... N83-10784 #
AD-A115052 ..... N83-10769 #
AD-A115082 ..... N83-10778 #
AD-A115092 ..... N83-10762 #
AD-A115093 ..... N83-10779 #
AD-A115097 ..... N83-10780 #
AD-A115100 ..... N83-10330 #
AD-A115185 ..... N83-10121 #
AD-A115205 ..... N83-10688 #
AD-A115532 ..... N83-10767 #
AD-A116819 ..... N83-10685 #
AD-A116849 ..... N83-10736 #
AD-A116884 ..... N83-10686 #
AD-A116984 ..... N83-10030 #
AD-A117030 ..... N83-10687 #
AD-A117074 ..... N83-10763 #
AD-A117154 ..... N83-10737 #
AD-A117277 ..... N83-10474 #
AD-A117318 ..... N83-10764 #
AD-A117319 ..... N83-10649 #
AD-A117349 ..... N83-10781 #
AD-A117413 ..... N83-10098 #
AD-A117414 ..... N83-10332 #
AD-A117425 ..... N83-10378* #
AD-A117448 ..... N83-10025 #
AD-A117449 ..... N83-10026 #
AD-A117464 ..... N83-10765 #
AD-A117465 ..... N83-10003 #
AD-A117466 ..... N83-10783 #
AD-A117467 ..... N83-10359 #
AD-A117468 ..... N83-10906 #
AD-A117469 ..... N83-10036 #
AD-A117470 ..... N83-10427 #
AD-A117472 ..... N83-10333 #
AD-A117511 ..... N83-10210 #
AD-A117512 ..... N83-10031 #
AD-A117513 ..... N83-10870 #
AD-A117514 ..... N83-10871 #
AD-A117515 ..... N83-10872 #
AD-A117526 ..... N83-10211 #
AD-A117529 ..... N83-10809 #
AD-A117530 ..... N83-10475 #
AD-A117532 ..... N83-10360 #
AD-A117539 ..... N83-10717 #
AD-A117540 ..... N83-10786 #
AD-A117542 ..... N83-10361 #
AD-A117543 ..... N83-10393 #
AD-A117544 ..... N83-10810 #
AD-A117545 ..... N83-10362 #
AD-A117546 ..... N83-10099 #
AD-A117568 ..... N83-10358 #
AD-A117595 ..... N83-10112 #
AD-A117596 ..... N83-10111 #
AD-A117599 ..... N83-10083 #
AD-A117600 ..... N83-10084 #
AD-A117601 ..... N83-10085 #
AD-A117602 ..... N83-10086 #
AD-A117603 ..... N83-10087 #
AD-A117736 ..... N83-10569 #
AD-A117737 ..... N83-10904 #
AD-A117739 ..... N83-10137 #
AD-A117741 ..... N83-10176 #
AD-A117743 ..... N83-10739 #
AD-A117744 ..... N83-10331 #
AD-A117745 ..... N83-10041 #
AD-A117746 ..... N83-10426 #
AD-A117747 ..... N83-10042 #
AD-A117749 ..... N83-10138 #
AD-A117755 ..... N83-10905 #
AD-A117765 ..... N83-10927 #
AD-A117767 ..... N83-10886 #
AD-A117797 ..... N83-10114 #
AD-A117806 ..... N83-10392 #
AD-A117807 ..... N83-10046 #
AD-A117809 ..... N83-10689 #
AD-A117810 ..... N83-10766 #
AD-A117828 ..... N83-10808 #
AD-A117859 ..... N83-10020 #
AD-A117871 ..... N83-10966 #
AD-A117892 ..... N83-10139 #
AD-A117993 ..... N83-10334 #
AD-A117995 ..... N83-10811 #
AD-A118055 ..... N83-10850 #
AD-A118285 ..... N83-10450 #
AD-A119004 ..... N83-10433 #

AD-D432830 ..... N83-10231 #
AD-D432836 ..... N83-10216 #
AD-D432842 ..... N83-10253 #

AFIT/GE/EE/81D-26 ..... N83-10767 #

AFOSR-82-0536TR ..... N83-10763 #
AFOSR-82-0550TR ..... N83-10687 #
AFOSR-82-0567TR ..... N83-10904 #
AFOSR-82-0570TR ..... N83-10966 #
AFOSR-82-0572TR ..... N83-10905 #
AFOSR-82-0588TR ..... N83-10392 #
AFOSR-82-0590TR ..... N83-10927 #
AFOSR-82-0619TR ..... N83-10020 #

AFRPL-TR-80-67-VOL-2 ..... N83-10114 #

AFWAL-TR-79-3095-VOL-3 ..... N83-10121 #
AFWAL-TR-81-2056-PT-1 ..... N83-10210 #
AFWAL-TR-81-2087-PT-4 ..... N83-10211 #
AFWAL-TR-81-2113 ..... N83-10138 #
AFWAL-TR-81-3180 ..... N83-10810 #
AFWAL-TR-82-2005 ..... N83-10569 #
AFWAL-TR-82-2039 ..... N83-10046 #

AGARD-AR-183 ..... N83-10039 #
AGARD-AR-187 ..... N83-10403 #

AGARD-CP-333 ..... N83-10054 #

AGESS-820210 ..... N83-10154 #

AHS-RWP-16 ..... N83-10425* #

AMC-81-18266 ..... N83-10348* #

AMMRC-TR-82-14 ..... N83-10176 #

ANL-82-29 ..... N83-10832 #

ANL/CNSV/TM-95 ..... N83-10612 #
ANL/CNSV/TM-96 ..... N83-10578 #

ANL/EES/TM-169 ..... N83-10650 #

ANL/FPP/TM-150 ..... N83-10938 #
ANL/FPP/TM-154 ..... N83-10937 #
AP-42-SUPPL-12 ..... N83-10654 #

AR-7 ..... N83-10671 #
AR-9 ..... N83-10994 #
AR-10 ..... N83-10747 #
AR-002-341 ..... N83-10173 #
AR-002-491 ..... N83-10042 #
AR-003-041 ..... N83-10209 #

ARDU-TI-778 ..... N83-10042 #

ARL-MAT-NOTE-132 ..... N83-10173 #

ARL/PSU/TM-82-135 ..... N83-10886 #

ARO-16713.19-MA ..... N83-10870 #

AR002777 ..... N83-10426 #

ATR-82(8454)-3 ..... N83-10998* #

AVRADCOM-TR-82-C-15 ..... N83-10425* #

B-202379 ..... N83-10875 #

BBC-RD-1982/8 ..... N83-10309 #
BBC-RD-1982/9 ..... N83-10310
BBC-RD-1982/10 ..... N83-10311 #
BBC-RD-1982/11 ..... N83-10312 #
BBC-RD-1982/12 ..... N83-10308 #
BBC-RD-1982/15 ..... N83-10314 #
BBC-RD-1982/16 ..... N83-10313 #

BDX-613-2787 ..... N83-10335 #

BLL-BG/MRS14580/82-(9022.048) ..... N83-10127 #

BLL-CTO-2075-(9091.9F) N83-10162

BLL-M26518 ..... N83-10163 #
BLL-M26519 ..... N83-10164 #
BLL-M26523 ..... N83-10165 #

BLL-RISLEY TR-4166F-(9091.9F) ..... N83-10431 #

BLL-T5869/BG/MRS14614/82 ..... N83-10495 #
BLL-T5870/BGLRS/T586(9022.048) ..... N83-10377 #

BM-IC-8869 ..... N83-10485 #
BM-IC-8875 ..... N83-10481 #

BM-OFR-37-82 ..... N83-10180 #

BM-RI-8588 ..... N83-10159 #
BM-RI-8590 ..... N83-10191 #
BM-RI-8594 ..... N83-10493 #
BM-RI-8603 ..... N83-10492 #
BM-RI-8610 ..... N83-10187 #
BM-RI-8612 ..... N83-10189 #
BM-RI-8615 ..... N83-10188 #
BM-RI-8616 ..... N83-10155 #
BM-RI-8629 ..... N83-10185 #
BM-RI-8633 ..... N83-10186 #
BM-RI-8656 ..... N83-10190 #

BMFT-FB-T-80-147 ..... N83-10374 #
BMFT-FB-T-82-063 ..... N83-10704 #
BMFT-FB-T-82-064 ..... N83-10368 #
BMFT-FB-T-82-065 ..... N83-10614 #
BMFT-FB-T-82-066 ..... N83-10615 #
BMFT-FB-T-82-067 ..... N83-10651 #
BMFT-FB-T-82-068 ..... N83-10142 #
BMFT-FB-T-82-069 ..... N83-10616 #
BMFT-FB-T-82-070 ..... N83-10718 #
BMFT-FB-T-82-071 ..... N83-10369 #
BMFT-FB-T-82-073 ..... N83-10143 #
BMFT-FB-T-82-074 ..... N83-10617 #
BMFT-FB-T-82-076-PT-1 ..... N83-10618 #
BMFT-FB-T-82-078 ..... N83-10619 #
BMFT-FB-T-82-079 ..... N83-10620 #
BMFT-FB-T-82-080 ..... N83-10432 #
BMFT-FB-T-82-081 ..... N83-10621 #
BMFT-FB-T-82-082 ..... N83-10336 #

BMFT-FB-T-82-083 ..... N83-10622 #
BMFT-FB-T-82-085 ..... N83-10623 #
BMFT-FB-T-82-086 ..... N83-10624 #
BMFT-FB-T-82-087 ..... N83-10478 #
BMFT-FB-T-82-088 ..... N83-10797 #
BMFT-FB-T-82-089 ..... N83-10796 #
BMFT-FB-T-82-091 ..... N83-10705 #
BMFT-FB-T-82-092 ..... N83-10410 #
BMFT-FB-T-82-093 ..... N83-10479 #
BMFT-FB-T-82-094 ..... N83-10629 #
BMFT-FB-T-82-095 ..... N83-10397 #
BMFT-FB-T-82-096 ..... N83-10144 #
BMFT-FB-T-82-097 ..... N83-10630 #
BMFT-FB-T-82-098 ..... N83-10625 #
BMFT-FB-T-82-099 ..... N83-10370 #
BMFT-FB-T-82-100 ..... N83-10145 #
BMFT-FB-T-82-101 ..... N83-10631 #
BMFT-FB-T-82-102 ..... N83-10428 #
BMFT-FB-T-82-103 ..... N83-10632 #
BMFT-FB-T-82-104 ..... N83-10626 #
BMFT-FB-T-82-105 ..... N83-10627 #
BMFT-FB-T-82-106 ..... N83-10719 #
BMFT-FB-T-82-107 ..... N83-10146 #
BMFT-FB-T-82-108 ..... N83-10652 #
BMFT-FB-T-82-109 ..... N83-10633 #
BMFT-FB-T-82-110 ..... N83-10371 #

BONN-HE-82-7 ..... N83-10899 #

BR-13058 ..... N83-10569 #

BR83571 ..... N83-10390 #
BR83882 ..... N83-10357 #
BR83884 ..... N83-10052 #
BR83907 ..... N83-10761 #
BR83954 ..... N83-10175 #
BR84101 ..... N83-10391 #

BULL-51-PT-1 ..... N83-10216 #
BULL-51-PT-2 ..... N83-10231 #
BULL-51-PT-3 ..... N83-10253 #

CBIP-PUBL-150-VOL-1 ..... N83-10634 #
CBIP-PUBL-150-VOL-2 ..... N83-10635 #

CE-82-1 ..... N83-10291 #

CNES-NT-103 ..... N83-10100 #

CNRS-CPT-79/P.1081-REV ..... N83-10874 #

CONF-811102-7 ..... N83-10889 #
CONF-811245 ..... N83-10578 #
CONF-820345-8 ..... N83-10933 #
CONF-820345-14 ..... N83-10934 #

COO-2780/5 ..... N83-10880 #

CSDL-R-1536 ..... N83-10111 #

CSDL-R1536-VOL-1 ..... N83-10112 #

CSIR-ME-1731 ..... N83-10443 #

CSIR-T/SEA-7910 ..... N83-10735 #

CTH-MATH-1982-8 ..... N83-10860 #
CTH-MATH-1982-09 ..... N83-10859 #
CTH-MATH-1982-10 ..... N83-10861 #

CUED/C-MATS/TR-32 ..... N83-10454 #

DE82-001096 ..... N83-10889 #
DE82-001112 ..... N83-10770 #
DE82-005852 ..... N83-10141 #
DE82-006870 ..... N83-10896 #
DE82-006879 ..... N83-10894 #
DE82-006997 ..... N83-10857 #
DE82-007147 ..... N83-10695 #
DE82-007195 ..... N83-10947 #
DE82-007256 ..... N83-10394 #
DE82-007644 ..... N83-10088 #
DE82-007724 ..... N83-10940 #
DE82-007790 ..... N83-10824 #
DE82-007912 ..... N83-10950 #
DE82-007985 ..... N83-10823 #
DE82-007990 ..... N83-10869 #
DE82-008101 ..... N83-10942 #
DE82-008142 ..... N83-10807 #
DE82-008144 ..... N83-10790 #
DE82-008146 ..... N83-10957 #
DE82-008354 ..... N83-10408 #
DE82-008441 ..... N83-10944 #
DE82-008488 ..... N83-10858 #
DE82-008975 ..... N83-10694 #
DE82-009384 ..... N83-10932 #
DE82-009548 ..... N83-10907 #
DE82-009938 ..... N83-10949 #
DE82-010165 ..... N83-10983 #
DE82-010324 ..... N83-10395 #
DE82-010382 ..... N83-10696 #
DE82-010600 ..... N83-10794 #
DE82-010641 ..... N83-10363 #
DE82-010710 ..... N83-10822 #
DE82-010902 ..... N83-10829 #
DE82-011507 ..... N83-10953 #
DE82-011783 ..... N83-10826 #
DE82-012054 ..... N83-10476 #
DE82-012199 ..... N83-10771 #
DE82-012361 ..... N83-10930 #
DE82-012362 ..... N83-10895 #
DE82-012388 ..... N83-10879 #
DE82-012426 ..... N83-11015 #
DE82-012493 ..... N83-10700 #
DE82-012496 ..... N83-10697 #
DE82-012502 ..... N83-10898 #
DE82-012540 ..... N83-10703 #
DE82-012569 ..... N83-10365 #
DE82-012573 ..... N83-10939 #
DE82-013224 ..... N83-10815 #
DE82-013226 ..... N83-10933 #
DE82-013274 ..... N83-10609 #
DE82-013341 ..... N83-10828 #
DE82-013342 ..... N83-10821 #
DE82-013373 ..... N83-10948 #
DE82-013388 ..... N83-10890 #
DE82-013391 ..... N83-10936 #
DE82-013411 ..... N83-10830 #
DE82-013512 ..... N83-10827 #
DE82-013524 ..... N83-10817 #
DE82-013629 ..... N83-10795 #
DE82-013710 ..... N83-10612 #
DE82-013712 ..... N83-10938 #
DE82-013750 ..... N83-10812 #
DE82-013935 ..... N83-10931 #
DE82-013939 ..... N83-10891 #
DE82-014123 ..... N83-10893 #
DE82-014264 ..... N83-10820 #
DE82-014337 ..... N83-10578 #
DE82-014502 ..... N83-10954 #
DE82-014514 ..... N83-10841 #
DE82-014522 ..... N83-10818 #
DE82-014663 ..... N83-10602 #
DE82-014836 ..... N83-10212 #
DE82-014989 ..... N83-10881 #
DE82-015031 ..... N83-10985 #
DE82-015034 ..... N83-10177 #
DE82-015099 ..... N83-10611 #
DE82-015106 ..... N83-10600 #
DE82-015141 ..... N83-10851 #
DE82-015201 ..... N83-10873 #
DE82-015206 ..... N83-10880 #
DE82-015239 ..... N83-10831 #
DE82-015264 ..... N83-10967 #
DE82-015473 ..... N83-10856* #
DE82-015476 ..... N83-10608 #
DE82-015493 ..... N83-10409 #
DE82-015648 ..... N83-10691 #
DE82-015671 ..... N83-10598 #
DE82-015673 ..... N83-10597 #
DE82-015763 ..... N83-10702 #
DE82-015790 ..... N83-10607 #
DE82-015793 ..... N83-10605 #
DE82-015820 ..... N83-10956 #
DE82-015855 ..... N83-10116 #
DE82-015862 ..... N83-10364 #
DE82-015871 ..... N83-10692 #
DE82-015881 ..... N83-10606 #
DE82-015900 ..... N83-10698 #
DE82-015998 ..... N83-10599 #
DE82-016000 ..... N83-10984 #
DE82-016022 ..... N83-10946 #
DE82-016056 ..... N83-10650 #
DE82-016088 ..... N83-10855 #
DE82-016133 ..... N83-10819 #
DE82-016182 ..... N83-10937 #
DE82-016244 ..... N83-10945 #
DE82-016299 ..... N83-10752 #
DE82-016320 ..... N83-10813 #
DE82-016327 ..... N83-10699 #
DE82-016361 ..... N83-10477 #
DE82-016364 ..... N83-10943 #
DE82-016407 ..... N83-10842 #
DE82-016421 ..... N83-10421 #
DE82-016580 ..... N83-10968 #
DE82-016806 ..... N83-10197 #
DE82-016913 ..... N83-10610 #
DE82-016923 ..... N83-10897 #
DE82-016940 ..... N83-10892 #
DE82-016956 ..... N83-10701 #
DE82-016957 ..... N83-10690 #
DE82-016995 ..... N83-10335 #
DE82-017001 ..... N83-10603 #
DE82-017098 ..... N83-10951 #
DE82-017120 ..... N83-10604 #
DE82-017122 ..... N83-10601 #
DE82-017127 ..... N83-10934 #
DE82-017351 ..... N83-10825 #
DE82-017353 ..... N83-10366 #
DE82-017384 ..... N83-10908 #
DE82-017396 ..... N83-10935 #
DE82-017467 ..... N83-10958 #
DE82-017639 ..... N83-10854 #
DE82-017640 ..... N83-10816 #
DE82-017641 ..... N83-10878 #
DE82-017660 ..... N83-10832 #
DE82-018269 ..... N83-10570 #
DE82-018347 ..... N83-10982 #
DE82-018392 ..... N83-10693 #
DE82-018409 ..... N83-10941 #
DE82-019043 ..... N83-10140 #
DE82-019373 ..... N83-10952 #
DE82-019546 ..... N83-10955 #
DE82-019724 ..... N83-10751 #
DE82-019733 ..... N83-10928 #
DE82-019807 ..... N83-10396 #
DE82-019826 ..... N83-10772 #
DE82-019827 ..... N83-10814 #
DE82-019902 ..... N83-10929 #
DE82-019955 ..... N83-10793 #
DE82-903181 ..... N83-10874 #
DE82-904374 ..... N83-10367 #
DE82-904663 ..... N83-10887 #
DE82-904990 ..... N83-10613 #

DFVLR-FB-82-07 ..... N83-10198 #

DFVLR-MITT-82-04 ..... N83-10032 #

DM51/BR-JP/0598-82 ..... N83-10339 #

DOE/DP-40138/1 ..... N83-10931 #

DOE/ER-0128 ..... N83-10898 #
DOE/ER-0132 ..... N83-10897 #
DOE/ER-02390/T2 ..... N83-10967 #
DOE/ER-03077/175 ..... N83-10856* #
DOE/ER-10512/3 ..... N83-10891 #
DOE/ER-70004/302 ..... N83-10408 #

DOE/ET-10329/1211-VOL-1 ..... N83-10212 #
DOE/ET-12489/T1 ..... N83-10606 #
DOE/ET-12548/14 ..... N83-10503* #
DOE/ET-17156/T21 ..... N83-10600 #
DOE/ET-27256/T10 ..... N83-10611 #
DOE/ET-51013/28 ..... N83-10944 #
DOE/ET-51013/29 ..... N83-10950 #
DOE/ET-51013/32 ..... N83-10932 #
DOE/ET-51013/36 ..... N83-10365 #
DOE/ET-51013/37 ..... N83-10939 #
DOE/ET-51013/38 ..... N83-10933 #
DOE/ET-51013/40 ..... N83-10934 #
DOE/ET-52042/5 ..... N83-10880 #
DOE/ET-53002/T1 ..... N83-10954 #
DOE/ET-53016/78 ..... N83-10952 #
DOE/ET-53051/41 ..... N83-10366 #
DOE/ET-53088/57 ..... N83-10946 #

DOE/EV-02958/6 ..... N83-10140 #
DOE/EV-10095/1 ..... N83-10770 #

DOE/JPL-1012-71 ..... N83-10505* #
DOE/JPL-1012-75 ..... N83-10552* #
DOE/JPL-1012-77-VOL-1 ..... N83-10553* #
DOE/JPL-1060-55 ..... N83-10551* #
DOE/JPL-106052 ..... N83-10525* #

DOE/NASA/0032-17-VOL-2 ..... N83-10991* #
DOE/NASA/0059-82/1 ..... N83-10349* #
DOE/NASA/0212-1 ..... N83-10561* #
DOE/NASA/10350-30 ..... N83-10208* #
DOE/NASA/13111-10 ..... N83-10559* #
DOE/NASA/13111-11 ..... N83-10557* #
DOE/NASA/13111-12 ..... N83-10556* #
DOE/NASA/13111-13 ..... N83-10560* #

DOE/NBM-2011507 ..... N83-10953 #

DOE/R5-10309/1 ..... N83-10602 #

DOI/DF-82/002A ..... N83-10709 #

DOT-TSC-FAA-82-4-1 ..... N83-10083 #
DOT-TSC-FAA-82-4-2 ..... N83-10084 #
DOT-TSC-FAA-82-4-3 ..... N83-10085 #
DOT-TSC-FAA-82-4-4 ..... N83-10086 #
DOT-TSC-FAA-82-4-5 ..... N83-10087 #

DOT-TSC-RSPA-81-13 ..... N83-10430 #

DOT/FAA/CT-82/36-1 ..... N83-10025 #
DOT/FAA/CT-82/36-2 ..... N83-10026 #
DOT/FAA/CT-82/44 ..... N83-10041 #

DOT/FAA/RD-82/41 ..... N83-10031 #

DP-MS-82-43 ..... N83-10752 #

DRIC-T-6676 ..... N83-10357 #
DRIC-T-6708 ..... N83-10175 #
DRIC-T-6709 ..... N83-10761 #

D6-51416 ..... N83-10172* #

E-638 ..... N83-10171* #
E-651-78-01 ..... N83-10095* #
E-1052 ..... N83-10208* #
E-1184 ..... N83-10045* #
E-1251 ..... N83-10389* #
E-1271 ..... N83-10134* #
E-1338 ..... N83-10019* #
E-1354 ..... N83-10554* #
E-1372 ..... N83-10558* #
E-1375 ..... N83-10118* #
E-1378 ..... N83-10135* #
E-1384 ..... N83-10962* #
E-1386 ..... N83-10555* #
E-1391 ..... N83-10322* #
E-1399 ..... N83-10194* #
E-1405 ..... N83-10425* #
E-1417 ..... N83-10557* #
E-1418 ..... N83-10559* #
E-1419 ..... N83-10556* #
E-1427 ..... N83-10885* #
E-1434 ..... N83-10560* #

EDE-10/82 ..... N83-10426 #

EDR-10982 ..... N83-10046 #

EECE-274(82)-NASA-931-1 ..... N83-10567* #

EGG-FE-5842 ..... N83-10873 #

EGG-FT-5885 ..... N83-10958 #

EGG-SD-5546 ..... N83-10771 #

EL-163 ..... N83-10314 #

EPA-AA-CTAB-PA-82-7 ..... N83-10663 #

EPA-450/3-82-010 ..... N83-10657 #
EPA-450/5-82-001 ..... N83-10670 #
EPA-600/2-82-045 ..... N83-10662 #
EPA-600/3-82-009 ..... N83-10412 #
EPA-600/3-82-040 ..... N83-10673 #
EPA-600/3-82-052 ..... N83-10482 #
EPA-600/3-82-056 ..... N83-10729 #
EPA-600/4 82-017B-PT-2 ..... N83-10414 #
EPA-600/4-82-017A-PT-1 ..... N83-10415 #
EPA-600/4-82-017C-PT-3 ..... N83-10413 #
EPA-606/J-81-531 ..... N83-10757 #

EPRI-CS-2367 ..... N83-10887 #

EPRI-EL-2395 ..... N83-10367 #

ERIM-155800-1-F1 ..... N83-10739 #

ERLN-X33 ..... N83-10757 #

ESA-CR(P)-1614 ..... N83-10101 #

ESD-TR-81-339 ..... N83-10686 #

ESL-711965-11 ..... N83-10324* #
ESL-712759-5 ..... N83-10320* #

ETL-R037 ..... N83-10685 #

ETS-63 ..... N83-10098 #

E83-10001 ..... N83-10458* #

FAA-EM-80-8-1 ..... N83-10083 #
FAA-EM-80-8-2 ..... N83-10084 #
FAA-EM-80-8-3 ..... N83-10085 #
FAA-EM-80-8-4 ..... N83-10086 #
FAA-EM-80-8-5 ..... N83-10087 #

FCC/OST-TM-82-1 ..... N83-10342 #

FCM-P17-1982 ..... N83-10706 #

FCR-2585 ..... N83-10637 #

FCTC-81/124 ..... N83-10801 #
FCTC-81/125 ..... N83-10792 #
FCTC-81/136 ..... N83-10844 #
FCTC-81/138 ..... N83-10798 #
FCTC-81/142 ..... N83-10800 #

FHWA-RD-82/063 ..... N83-10306 #

FHWA/CT/RD-722-2-81/12 ..... N83-10300 #

FHWA/LA-81/152 ..... N83-10288 #

FHWA/NH-82/1 ..... N83-10291 #

FHWA/RD-81-147 ..... N83-10292 #
FHWA/RD-81/05 ..... N83-10276 #
FHWA/RD-81/081 ..... N83-10301 #
FHWA/RD-81/107 ..... N83-10124 #
FHWA/RD-82/012-VOL-1 ..... N83-10282 #
FHWA/RD-82/060 ..... N83-10289 #
FHWA/RD-082/013 ..... N83-10283 #

FHWA/VA-82/07 ..... N83-10125 #
FHWA/VA-82/24 ..... N83-10293 #

FHWA/WY-82/3161 ..... N83-10305 #

FOA-C-10195-M8 ..... N83-10862 #
FOA-C-10199-M6 ..... N83-10835 #
FOA-C-10202-M2 ..... N83-10628 #

FSR-4 ..... N83-10137 #

FSU-STATISTICS-M630 ..... N83-10870 #

FTD-ID(RS)T-0285-82 ..... N83-10003 #
FTD-ID(RS)T-0368-82 ..... N83-10783 #
FTD-ID(RS)T-0469-82 ..... N83-10906 #
FTD-ID(RS)T-0470-82 ..... N83-10036 #
FTD-ID(RS)T-0506-82 ..... N83-10765 #
FTD-ID(RS)T-0517-82 ..... N83-10099 #
FTD-ID(RS)T-0523-82 ..... N83-10362 #
FTD-ID(RS)T-0566-82 ..... N83-10427 #
FTD-ID(RS)T-0735-82 ..... N83-10359 #

FTZ-444-TBR-9 ..... N83-10337 #

FWS/OBS-81/01 ..... N83-10659 #
FWS/OBS-81/54 ..... N83-10655 #
FWS/OBS-81/55 ..... N83-10658 #

GA-A-16719 ..... N83-10831 #
GA-A-16738 ..... N83-10908 #

GC-TR-82-158.4(A) ..... N83-10850 #

GERA-2424 ..... N83-10119* #

GERPDC-81-603 ..... N83-10642 #

GKSS-82/E/11 ..... N83-10451 #

GPO-89-006 ..... N83-10988 #
GPO-97-828 ..... N83-10107 #

GRI-77/0015 ..... N83-10637 #
GRI-80/0103 ..... N83-10285 #
GRI-80/0106 ..... N83-10150 #
GRI-80/0113 ..... N83-10161 #
GRI-80/0116 ..... N83-10156 #
GRI-80/0134 ..... N83-10429 #
GRI-81/0005 ..... N83-10638 #
GRI-81/0009 ..... N83-10756 #
GRI-81/0023 ..... N83-10755 #
GRI-81/0030 ..... N83-10204 #
GRI-81/0033 ..... N83-10290 #
GRI-81/0050 ..... N83-10213 #
GRI-82/0008 ..... N83-10160 #
GRI-82/0009.1 ..... N83-10641 #

GTFR-30 ..... N83-10951 #

H-REPT-97-891 ..... N83-10988 #

HARL-ONR-8102 ..... N83-10778 #
HARL-ONR-8105 ..... N83-10779 #

HDL-TM-81-22 ..... N83-10334 #

HEDL-TC-2132 ..... N83-10830 #

IFSR-55 ..... N83-10881 #
IFSR-57 ..... N83-10946 #

IIASA-RR-82-16 ..... N83-10498 #
IIASA-RR-82-20 ..... N83-10499

INPE-2391-TDL/086 ..... N83-10382 #
INPE-2399-TDL/087 ..... N83-10678 #
INPE-2403-TDL/090 ..... N83-10354 #
INPE-2411-PRE/120 ..... N83-10351 #
INPE-2412-TDL/092 ..... N83-10715 #
INPE-2436-PRE/137 ..... N83-10355 #
INPE-2438-PRE/139 ..... N83-11012 #
INPE-2440-PRE/141 ..... N83-10352 #
INPE-2447-PRE/146 ..... N83-10845 #
INPE-2451-RPE/412 ..... N83-10964 #
INPE-2453-PRE/149 ..... N83-10353 #
INPE-2456-PRE/151 ..... N83-10971 #
INPE-2459-TDL/095 ..... N83-10678 #
INPE-2460-TDL/096 ..... N83-10405 #
INPE-2461-PRE/153 ..... N83-10716 #
INPE-2462-PRE/154 ..... N83-10096 #
INPE-2463-PRE/155 ..... N83-10326 #
INPE-2468-PRE/157 ..... N83-10327 #
INPE-2473-PRE/162 ..... N83-10677 #
INPE-2487-PRE/171 ..... N83-10679 #

IPF-82-4 ..... N83-10422 #

IPP-4/205 ..... N83-10319
IPP-6/212 ..... N83-10914

IPPJ-577 ..... N83-10922 #
IPPJ-587 ..... N83-10920 #
IPPJ-594 ..... N83-10919 #
IPPJ-596 ..... N83-10918 #
IPPJ-599 ..... N83-10921 #
IPPJ-602 ..... N83-10917 #
IPPJ-603 ..... N83-10916 #
IPPJ-604 ..... N83-10915 #

IS-4794 ..... N83-10570 #

ISBN-0-309-03226-1 ..... N83-10665 #
ISBN-0-309-03262-8 ..... N83-10992 #
ISBN-0-7988-1484-5 ..... N83-10443 #
ISBN-0-7988-2175-0 ..... N83-10735 #
ISBN-3-7045-0036-4 ..... N83-10498 #
ISBN-3-7045-0040-2 ..... N83-10499
ISBN-91-3669-0 ..... N83-10787 #
ISBN-92-835-0313-8 ..... N83-10054 #
ISBN-951-38-1137-9 ..... N83-10976 #
ISBN-951-38-1284-7 ..... N83-10152 #
ISBN-951-38-1318-5 ..... N83-10843 #

ISS-RAD-82/2 ..... N83-10969 #

ISSN-0077-5606 ..... N83-10115 #
ISSN-0082-5255 ..... N83-10028 #
ISSN-0082-5255 ..... N83-10273 #
ISSN-0082-5255 ..... N83-10882 #
ISSN-0082-5255 ..... N83-10923 #
ISSN-0082-5263 ..... N83-10381 #
ISSN-0143-7313 ..... N83-10133
ISSN-0143-7313 ..... N83-10169
ISSN-0172-8733 ..... N83-10899 #
ISSN-0309-6505 ..... N83-10454 #
ISSN-0340-7608 ..... N83-10142 #
ISSN-0340-7608 ..... N83-10143 #
ISSN-0340-7608 ..... N83-10144 #
ISSN-0340-7608 ..... N83-10145 #
ISSN-0340-7608 ..... N83-10146 #
ISSN-0340-7608 ..... N83-10336 #
ISSN-0340-7608 ..... N83-10368 #
ISSN-0340-7608 ..... N83-10369 #
ISSN-0340-7608 ..... N83-10370 #
ISSN-0340-7608 ..... N83-10371 #
ISSN-0340-7608 ..... N83-10397 #
ISSN-0340-7608 ..... N83-10410 #
ISSN-0340-7608 ..... N83-10428 #
ISSN-0340-7608 ..... N83-10432 #
ISSN-0340-7608 ..... N83-10478 #
ISSN-0340-7608 ..... N83-10479 #
ISSN-0340-7608 ..... N83-10614 #
ISSN-0340-7608 ..... N83-10615 #
ISSN-0340-7608 ..... N83-10616 #
ISSN-0340-7608 ..... N83-10617 #
ISSN-0340-7608 ..... N83-10618 #
ISSN-0340-7608 ..... N83-10619 #
ISSN-0340-7608 ..... N83-10620 #
ISSN-0340-7608 ..... N83-10621 #
ISSN-0340-7608 ..... N83-10622 #
ISSN-0340-7608 ..... N83-10623 #
ISSN-0340-7608 ..... N83-10624 #
ISSN-0340-7608 ..... N83-10625 #
ISSN-0340-7608 ..... N83-10626 #
ISSN-0340-7608 ..... N83-10627 #
ISSN-0340-7608 ..... N83-10629 #
ISSN-0340-7608 ..... N83-10630 #

ISSN-0340-7608 ..... N83-10631 #
ISSN-0340-7608 ..... N83-10632 #
ISSN-0340-7608 ..... N83-10633 #
ISSN-0340-7608 ..... N83-10651 #
ISSN-0340-7608 ..... N83-10652 #
ISSN-0340-7608 ..... N83-10704 #
ISSN-0340-7608 ..... N83-10705 #
ISSN-0340-7608 ..... N83-10718 #
ISSN-0340-7608 ..... N83-10719 #
ISSN-0340-7608 ..... N83-10796 #
ISSN-0340-7608 ..... N83-10797 #
ISSN-0344-9629 ..... N83-10451 #
ISSN-0348-1050 ..... N83-10299 #
ISSN-0355-3639 ..... N83-10976 #
ISSN-0358-5085 ..... N83-10152 #
ISSN-0360-859X ..... N83-10992 #
ISSN-0770-4615 ..... N83-10563 #

ISVR-TR-119 ..... N83-10338 #

ISWS/CIR-147/81 ..... N83-10672 #

ISWS/CON-257/81 ..... N83-10721 #

ISWS/RI-96/81 ..... N83-10723 #

JAB-10145-1 ..... N83-10692 #

JHU/APL/MQR-81 ..... N83-10774 #

JHU/APL/QM-81-126 ..... N83-10710 #
JHU/APL/QM-81-130 ..... N83-10636 #
JHU/APL/QM-81-133 ..... N83-10640 #
JHU/APL/QM-81-144 ..... N83-10643 #

JPL-PUB-81-66-VOL-3 ..... N83-10350* #
JPL-PUB-82-15 ..... N83-10503* #
JPL-PUB-82-30 ..... N83-10504* #
JPL-PUB-82-48 ..... N83-10505* #
JPL-PUB-82-61 ..... N83-10321* #
JPL-PUB-82-66 ..... N83-10525* #
JPL-PUB-82-70 ..... N83-10551* #
JPL-PUB-82-73 ..... N83-10552* #
JPL-PUB-82-81-VOL-1 ..... N83-10553* #

JPL-5101-209 ..... N83-10505* #
JPL-5105-118 ..... N83-10525* #
JPL-9950-738 ..... N83-10473* #

JPRS-81965 ..... N83-10713 #

J510-82-007A/2112-VOL-1 ..... N83-10212 #

KICT-35 ..... N83-10286 #

KMSF-U-1195 ..... N83-10394 #

L-14366 ..... N83-10082* #
L-15314 ..... N83-10016* #
L-15321 ..... N83-10024* #
L-15379 ..... N83-10442* #
L-15453 ..... N83-10035* #
L-15493 ..... N83-10883* #

LA-8795-GEOL ..... N83-10694 #
LA-9049-MS ..... N83-10907 #
LA-9061-M ..... N83-10829 #
LA-9186-MS ..... N83-10893 #
LA-9244-MS ..... N83-10842 #
LA-9278-MS ..... N83-10985 #
LA-9307-PR ..... N83-10698 #
LA-9314-M ..... N83-10812 #
LA-9333-T ..... N83-10935 #
LA-9338-MS ..... N83-10421 #
LA-9344-MS ..... N83-10945 #

LBL-13700 ..... N83-10983 #
LBL-13987 ..... N83-10895 #
LBL-14038 ..... N83-10930 #
LBL-14265 ..... N83-10892 #

LC-81-600035 ..... N83-10746 #
LC-81-600102 ..... N83-10775 #
LC-81-600117 ..... N83-10458* #
LC-81-600173 ..... N83-10147 #
LC-82-600542 ..... N83-10909 #

LIDS-R-1176 ..... N83-10987 #

LIR/03-82/3 ..... N83-10653 #

LMSC-HREC-TR-D784759 ..... N83-10387* #

LR-28360-19-VOL-3 ..... N83-10121 #

M-389 ..... N83-10876* #

M-492-206-82-06 ..... N83-10097* #

MASAD-81-20 ..... N83-10875 #

MBB-UD-348 ..... N83-10037 #
MBB-UD-353 ..... N83-10021 #

ME-TN-81-9180-3 ..... N83-10500 #

MIT-EL-81-001 ..... N83-10669 #
MIT-EL-81-020 ..... N83-10668 #
MIT-EL-81-036 ..... N83-10667 #
MIT-EL-81-040 ..... N83-10296 #
MIT-EL-81-044 ..... N83-10302 #

MR-002 ..... N83-10104* #
MR-003 ..... N83-10105* #
MR-004 ..... N83-10103* #

MRI-7014-G ..... N83-10207* #

MRL-TN-464 ..... N83-10209 #

MTG-17 ..... N83-10275 #

MTI-82TR38 ..... N83-10568* #

MTR-8701 ..... N83-10325* #

M26521 ..... N83-10128 #

NACOA-21 ..... N83-10747 #

NAS 1.15:35457 ..... N83-10109* #
NAS 1.15:76707 ..... N83-11006* #
NAS 1.15:76814 ..... N83-10002* #
NAS 1.15:76887 ..... N83-10749* #
NAS 1.15:82493 ..... N83-10424* #
NAS 1.15:82497 ..... N83-10094* #
NAS 1.15:82498 ..... N83-10108* #
NAS 1.15:82499 ..... N83-10113* #
NAS 1.15:82500 ..... N83-10093* #
NAS 1.15:82739 ..... N83-10208* #
NAS 1.15:82876 ..... N83-10389* #
NAS 1.15:82893 ..... N83-10134* #
NAS 1.15:82935 ..... N83-10171* #
NAS 1.15:82939 ..... N83-10019* #
NAS 1.15:82948 ..... N83-10554* #
NAS 1.15:82957 ..... N83-10558* #
NAS 1.15:82958 ..... N83-10118* #
NAS 1.15:82961 ..... N83-10135* #
NAS 1.15:82965 ..... N83-10962* #
NAS 1.15:82966 ..... N83-10555* #
NAS 1.15:82970 ..... N83-10322* #
NAS 1.15:82972 ..... N83-10194* #
NAS 1.15:82976 ..... N83-10425* #
NAS 1.15:82985 ..... N83-10557* #
NAS 1.15:82986 ..... N83-10559* #
NAS 1.15:82987 ..... N83-10556* #
NAS 1.15:82994 ..... N83-10885* #
NAS 1.15:82998 ..... N83-10560* #
NAS 1.15:83241 ..... N83-10566* #
NAS 1.15:83252 ..... N83-10034* #
NAS 1.15:83963 ..... N83-11007* #
NAS 1.15:83964 ..... N83-10903* #
NAS 1.15:83970 ..... N83-10674* #
NAS 1.15:83983 ..... N83-11011* #
NAS 1.15:83992 ..... N83-11010* #
NAS 1.15:84001 ..... N83-10999* #
NAS 1.15:84006 ..... N83-10996* #
NAS 1.15:84258-PT-1 ..... N83-10049* #
NAS 1.15:84258-PT-2 ..... N83-10050* #
NAS 1.15:84276 ..... N83-10048* #
NAS 1.15:84281 ..... N83-10051* #
NAS 1.15:84490 ..... N83-10017* #
NAS 1.15:84527 ..... N83-10082* #
NAS 1.15:84528 ..... N83-10035* #
NAS 1.15:84538 ..... N83-10024* #
NAS 1.15:84541 ..... N83-10420* #
NAS 1.15:84544 ..... N83-10447* #
NAS 1.15:84546 ..... N83-10806* #
NAS 1.15:84547 ..... N83-10647* #
NAS 1.15:84551 ..... N83-10407* #
NAS 1.15:84723 ..... N83-10378* #
NAS 1.15:84859 ..... N83-10095* #
NAS 1.15:84863 ..... N83-10106* #
NAS 1.15:84864 ..... N83-10105* #
NAS 1.15:84865 ..... N83-10104* #
NAS 1.15:84866 ..... N83-10103* #
NAS 1.15:84869 ..... N83-10097* #
NAS 1.15:84893 ..... N83-10998* #
NAS 1.21:7011(236) N83-10758*
NAS 1.21:7037(151) ..... N83-10001* #
NAS 1.21:7039(21)-SECT-1 ..... N83-10978*
NAS 1.21:7039(21)-SECT-2 ..... N83-10979*
NAS 1.21:7041(34) N83-10456*

NAS 1.26:3495 ..... N83-10441* #
NAS 1.26:3556 ..... N83-10645* #
NAS 1.26:3557 ..... N83-10646* #
NAS 1.26:3599 ..... N83-10388* #
NAS 1.26:3607 ..... N83-10120* #
NAS 1.26:3612 ..... N83-10383* #
NAS 1.26:3617 ..... N83-10172* #
NAS 1.26:157737 ..... N83-10760* #
NAS 1.26:162080-VOL-2 ..... N83-10848* #
NAS 1.26:162082-VOL-4 ..... N83-10849* #
NAS 1.26:165274 ..... N83-10568* #
NAS 1.26:165543 ..... N83-10561* #
NAS 1.26:165601 ..... N83-10348* #
NAS 1.26:165618 ..... N83-10044* #
NAS 1.26:165935 ..... N83-10018* #
NAS 1.26:165962 ..... N83-10379* #
NAS 1.26:165979 ..... N83-10110* #
NAS 1.26:165980 ..... N83-10081* #
NAS 1.26:165982 ..... N83-10562* #
NAS 1.26:166274 ..... N83-10029* #
NAS 1.26:166282 ..... N83-10027* #
NAS 1.26:166404 ..... N83-10047* #
NAS 1.26:166409 ..... N83-10195* #
NAS 1.26:166410 ..... N83-10119* #
NAS 1.26:167736 ..... N83-10091* #
NAS 1.26:167739 ..... N83-10804* #
NAS 1.26:167741 ..... N83-10092* #
NAS 1.26:167931 ..... N83-10325* #
NAS 1.26:167936 ..... N83-10991* #
NAS 1.26:167943 ..... N83-10970* #
NAS 1.26:167953 ..... N83-10502* #
NAS 1.26:167978 ..... N83-10349* #
NAS 1.26:167981 ..... N83-10207* #
NAS 1.26:169362 ..... N83-10675* #
NAS 1.26:169363 ..... N83-10867* #
NAS 1.26:169365 ..... N83-10525* #
NAS 1.26:169366 ..... N83-10963* #
NAS 1.26:169367 ..... N83-10997* #
NAS 1.26:169368 ..... N83-10380* #
NAS 1.26:169369 ..... N83-10504* #
NAS 1.26:169370 ..... N83-10505* #
NAS 1.26:169372 ..... N83-10553* #
NAS 1.26:169373 ..... N83-10551* #
NAS 1.26:169381 ..... N83-10856* #
NAS 1.26:169395 ..... N83-10214* #
NAS 1.26:169428 ..... N83-10321* #
NAS 1.26:169429 ..... N83-10503* #
NAS 1.26:169430 ..... N83-10350* #
NAS 1.26:169431 ..... N83-10552* #
NAS 1.26:169432 ..... N83-10472* #
NAS 1.26:169433 ..... N83-10473* #
NAS 1.26:169434 ..... N83-10680* #
NAS 1.26:169435 ..... N83-10567* #
NAS 1.26:169436 ..... N83-11001* #
NAS 1.26:169438 ..... N83-10750* #
NAS 1.26:169439 ..... N83-11005* #
NAS 1.26:169440 ..... N83-10404* #
NAS 1.26:169441 ..... N83-10803* #
NAS 1.26:169442 ..... N83-10320* #
NAS 1.26:169443 ..... N83-11004* #
NAS 1.26:169444 ..... N83-10387* #
NAS 1.26:169445 ..... N83-10777* #
NAS 1.26:169446 ..... N83-10840* #
NAS 1.26:169447 ..... N83-10972* #
NAS 1.26:169448 ..... N83-10323* #
NAS 1.26:169449 ..... N83-10324* #
NAS 1.26:169453 ..... N83-10648* #
NAS 1.26:169454 ..... N83-10995* #
NAS 1.26:169455 ..... N83-10023* #
NAS 1.26:169456 ..... N83-10196* #
NAS 1.26:169457 ..... N83-10174* #
NAS 1.26:169458 ..... N83-10684* #
NAS 1.26:169460 ..... N83-10329* #
NAS 1.26:169461 ..... N83-10448* #
NAS 1.26:169462 ..... N83-10449* #
NAS 1.55:2242 ..... N83-10883* #
NAS 1.60:2057 ..... N83-10045* #
NAS 1.60:2068 ..... N83-10016* #
NAS 1.60:2070 ..... N83-10442* #
NAS 1.60:2086 ..... N83-10676* #
NAS 1.61:1078 ..... N83-10458* #

NASA-CASE-GSC-12608-1 ..... N83-10900*

NASA-CASE-LEW-12919-1 ..... N83-10117*
NASA-CASE-LEW-12941-1 ..... N83-10170*
NASA-CASE-LEW-13131-1 ..... N83-10494*

NASA-CASE-MFS-25208-1 ..... N83-10345*
NASA-CASE-MFS-25426-1 ..... N83-10126*

NASA-CASE-NPO-14369-1 ..... N83-10501*
NASA-CASE-NPO-15021-1 ..... N83-10417*
NASA-CASE-NPO-15351-1 ..... N83-10040*

NASA-CP-2242 ..... N83-10883* #

NASA-CR-3495 ..... N83-10441* #
NASA-CR-3556 ..... N83-10645* #
NASA-CR-3557 ..... N83-10646* #
NASA-CR-3599 ..... N83-10388* #
NASA-CR-3607 ..... N83-10120* #
NASA-CR-3612 ..... N83-10383* #
NASA-CR-3617 ..... N83-10172* #
NASA-CR-162080-VOL-2 ..... N83-10848* #
NASA-CR-162082-VOL-4 ..... N83-10849* #
NASA-CR-165274 ..... N83-10568* #
NASA-CR-165543 ..... N83-10561* #
NASA-CR-165601 ..... N83-10348* #
NASA-CR-165618 ..... N83-10044* #
NASA-CR-165935 ..... N83-10018* #
NASA-CR-165962 ..... N83-10379* #
NASA-CR-165979 ..... N83-10110* #
NASA-CR-165980 ..... N83-10081* #
NASA-CR-165982 ..... N83-10562* #
NASA-CR-166274 ..... N83-10029* #
NASA-CR-166282 ..... N83-10027* #
NASA-CR-166404 ..... N83-10047* #
NASA-CR-166409 ..... N83-10195* #
NASA-CR-166410 ..... N83-10119* #
NASA-CR-167736 ..... N83-10091* #
NASA-CR-167737 ..... N83-10760* #
NASA-CR-167739 ..... N83-10804* #
NASA-CR-167741 ..... N83-10092* #
NASA-CR-167931 ..... N83-10325* #
NASA-CR-167936 ..... N83-10991* #
NASA-CR-167943 ..... N83-10970* #
NASA-CR-167953 ..... N83-10502* #
NASA-CR-167978 ..... N83-10349* #
NASA-CR-167981 ..... N83-10207* #
NASA-CR-169362 ..... N83-10675* #
NASA-CR-169363 ..... N83-10867* #
NASA-CR-169365 ..... N83-10525* #
NASA-CR-169366 ..... N83-10963* #
NASA-CR-169367 ..... N83-10997* #
NASA-CR-169368 ..... N83-10380* #
NASA-CR-169369 ..... N83-10504* #
NASA-CR-169370 ..... N83-10505* #
NASA-CR-169372 ..... N83-10553* #
NASA-CR-169373 ..... N83-10551* #
NASA-CR-169381 ..... N83-10856* #
NASA-CR-169395 ..... N83-10214* #
NASA-CR-169428 ..... N83-10321* #
NASA-CR-169429 ..... N83-10503* #
NASA-CR-169430 ..... N83-10350* #
NASA-CR-169431 ..... N83-10552* #
NASA-CR-169432 ..... N83-10472* #
NASA-CR-169433 ..... N83-10473* #
NASA-CR-169434 ..... N83-10680* #
NASA-CR-169435 ..... N83-10567* #
NASA-CR-169436 ..... N83-11001* #
NASA-CR-169438 ..... N83-10750* #
NASA-CR-169439 ..... N83-11005* #
NASA-CR-169440 ..... N83-10404* #
NASA-CR-169441 ..... N83-10803* #
NASA-CR-169442 ..... N83-10320* #
NASA-CR-169443 ..... N83-11004* #
NASA-CR-169444 ..... N83-10387* #
NASA-CR-169445 ..... N83-10777* #
NASA-CR-169446 ..... N83-10840* #
NASA-CR-169447 ..... N83-10972* #
NASA-CR-169448 ..... N83-10323* #
NASA-CR-169449 ..... N83-10324* #
NASA-CR-169453 ..... N83-10648* #
NASA-CR-169454 ..... N83-10995* #
NASA-CR-169455 ..... N83-10023* #
NASA-CR-169456 ..... N83-10196* #
NASA-CR-169457 ..... N83-10174* #
NASA-CR-169458 ..... N83-10684* #
NASA-CR-169460 ..... N83-10329* #
NASA-CR-169461 ..... N83-10448* #
NASA-CR-169462 ..... N83-10449* #

NASA-RP-1078 ..... N83-10458* #

NASA-SP-7011(236) N83-10758*
NASA-SP-7037(151) ..... N83-10001* #
NASA-SP-7039(21)-SECT-1 ..... N83-10978*
NASA-SP-7039(21)-SECT-2 ..... N83-10979*
NASA-SP-7041(34) N83-10456*
NASA-SP-7051-VOL-1 ..... N83-10980*
NASA-SP-7051-VOL-2 ..... N83-10981*

NASA-TM-76707 ..... N83-11006* #
NASA-TM-76814 ..... N83-10002* #
NASA-TM-76887 ..... N83-10749* #
NASA-TM-81375 ..... N83-10109* #
NASA-TM-82493 ..... N83-10424* #
NASA-TM-82497 ..... N83-10094* #
NASA-TM-82498 ..... N83-10108* #
NASA-TM-82499 ..... N83-10113* #
NASA-TM-82500 ..... N83-10093* #
NASA-TM-82739 ..... N83-10208* #
NASA-TM-82876 ..... N83-10389* #
NASA-TM-82893 ..... N83-10134* #
NASA-TM-82935 ..... N83-10171* #
NASA-TM-82939 ..... N83-10019* #
NASA-TM-82948 ..... N83-10554* #
NASA-TM-82957 ..... N83-10558* #
NASA-TM-82958 ..... N83-10118* #
NASA-TM-82961 ..... N83-10135* #
NASA-TM-82965 ..... N83-10962* #
NASA-TM-82966 ..... N83-10555* #
NASA-TM-82970 ..... N83-10322* #
NASA-TM-82972 ..... N83-10194* #
NASA-TM-82976 ..... N83-10425* #
NASA-TM-82985 ..... N83-10557* #
NASA-TM-82986 ..... N83-10559* #
NASA-TM-82987 ..... N83-10556* #
NASA-TM-82994 ..... N83-10885* #
NASA-TM-82998 ..... N83-10560* #
NASA-TM-83241 ..... N83-10566* #
NASA-TM-83252 ..... N83-10034* #
NASA-TM-83963 ..... N83-11007* #
NASA-TM-83964 ..... N83-10903* #
NASA-TM-83970 ..... N83-10674* #
NASA-TM-83983 ..... N83-11011* #
NASA-TM-83992 ..... N83-11010* #
NASA-TM-84001 ..... N83-10999* #
NASA-TM-84006 ..... N83-10996* #
NASA-TM-84258-PT-1 ..... N83-10049* #
NASA-TM-84258-PT-2 ..... N83-10050* #
NASA-TM-84276 ..... N83-10048* #
NASA-TM-84281 ..... N83-10051* #
NASA-TM-84490 ..... N83-10017* #
NASA-TM-84527 ..... N83-10082* #
NASA-TM-84528 ..... N83-10035* #
NASA-TM-84538 ..... N83-10024* #
NASA-TM-84541 ..... N83-10420* #
NASA-TM-84544 ..... N83-10447* #
NASA-TM-84546 ..... N83-10806* #
NASA-TM-84547 ..... N83-10647* #
NASA-TM-84551 ..... N83-10407* #
NASA-TM-84723 ..... N83-10378* #
NASA-TM-84859 ..... N83-10095* #
NASA-TM-84863 ..... N83-10106* #
NASA-TM-84864 ..... N83-10105* #
NASA-TM-84865 ..... N83-10104* #
NASA-TM-84866 ..... N83-10103* #
NASA-TM-84869 ..... N83-10097* #
NASA-TM-84893 ..... N83-10998* #

NASA-TP-2057 ..... N83-10045* #
NASA-TP-2068 ..... N83-10016* #
NASA-TP-2070 ..... N83-10442* #
NASA-TP-2086 ..... N83-10876* #

NAUFP-202-1 ..... N83-10970* #

NBDL-81R014 ..... N83-10782 #
NBDL-82R003 ..... N83-10784 #

NBRI-BOU-854 ..... N83-10307 #

NBS-GCR-82-372 ..... N83-10799 #
NBS-GCR-82-384 ..... N83-10838 #
NBS-GCR-82-386 ..... N83-10836 #
NBS-GCR-82-387 ..... N83-10837 #
NBS-GCR-82-390 ..... N83-10986 #

NBS-HB-138 ..... N83-10775 #

NBS-SP-260-73 ..... N83-10147 #
NBS-SP-260-75 ..... N83-10909 #

NBSIR-80-2176 ..... N83-10401 #
NBSIR-81-1652 ..... N83-10416 #
NBSIR-81-2380 ..... N83-10294 #
NBSIR-81-2393 ..... N83-10297 #
NBSIR-81-2427-1 ..... N83-10304 #
NBSIR-81-2436 ..... N83-10200 #
NBSIR-82-1659 ..... N83-10341 #
NBSIR-82-2458 ..... N83-10284 #
NBSIR-82-2471 ..... N83-10376 #
NBSIR-82-2472 ..... N83-10153 #
NBSIR-82-2478 ..... N83-10400 #
NBSIR-82-2490 ..... N83-10199 #

NE-87(81)OWRT-476-2-VOL-1 ..... N83-10149 #
NE-87(81)OWRT-476-2-VOL-2 ..... N83-10148 #

NIAST-81/124 ..... N83-10877 #

NLM-MED-82-02 ..... N83-10773 #

NLR-MP-80011-U ..... N83-10888 #
NLR-MP-81036-U ..... N83-10785 #

NLR-TR-81135-U ..... N83-10043 #

NOAA-DR-ERL-PMEL-4 ..... N83-10743 #

NOAA-TM-ERL-ARL-110 ..... N83-10711 #

NOAA-TM-ERL-GLERL-38 ..... N83-10489 #

NOAA-TM-ERL-OWRM-11 ..... N83-10730 #
NOAA-TM-ERL-OWRM-13 ..... N83-10722 #
NOAA-TM-ERL-OWRM-14 ..... N83-10727 #

NOAA-TM-ERL-WPL-86 ..... N83-10744 #

NOAA-TM-NWS-TDL-70 ..... N83-10726 #

NOAA-TM-NWS-WR-169 ..... N83-10732 #
NOAA-TM-NWS-WR-173 ..... N83-10733 #

NOAA-TM-OMPA-16 ..... N83-10742 #

NOAA-TM-OTES-3 ..... N83-10745 #

NOAA-TR-NESS-87 ..... N83-10734 #

NOAA-TR-NOS-92-NGS-22 ..... N83-10484 #

NOAA-TR-OTES-6 ..... N83-10707 #
NOAA-TR-OTES-7 ..... N83-10741 #

NOAA-81072405 ..... N83-10483 #
NOAA-81122901 ..... N83-10744 #
NOAA-82012201 ..... N83-10671 #
NOAA-82012902 ..... N83-10489 #
NOAA-82021005 ..... N83-10745 #
NOAA-82031502 ..... N83-10732 #
NOAA-82031503 ..... N83-10733 #
NOAA-82032214 ..... N83-10484 #
NOAA-82040704 ..... N83-10722 #
NOAA-82040705 ..... N83-10487 #
NOAA-82040801 ..... N83-10706 #
NOAA-82040906-PT-2 ..... N83-11008 #
NOAA-82040907 ..... N83-11009 #
NOAA-82041201 ..... N83-10725 #
NOAA-82041501 ..... N83-10707 #
NOAA-82041502 ..... N83-10741 #
NOAA-82041504 ..... N83-10726 #
NOAA-82041505 ..... N83-10728 #
NOAA-82042001 ..... N83-10742 #
NOAA-82042301 ..... N83-10743 #
NOAA-82042302 ..... N83-10727 #
NOAA-82042303 ..... N83-10711 #
NOAA-82042702 ..... N83-10656 #
NOAA-82042703 ..... N83-10740 #
NOAA-82042903 ..... N83-10730 #

NOO-TR-287 ..... N83-10737 #

NORDA-TN-147 ..... N83-10739 #

NOSC-TR-690 ..... N83-10768 #

NPL-DMA(A)-44 ..... N83-10169
NPL-DMA(A)-50 ..... N83-10133

NRC/CNR-TT-2027 ..... N83-10115 #

NRL-8596 ..... N83-10332 #
NRL-8624 ..... N83-10689 #

NSF/CEE-81048 ..... N83-10276 #
NSF/CEE-81049 ..... N83-10279 #
NSF/CEE-82003 ..... N83-10706 #
NSF/CEE-82004 ..... N83-10280 #
NSF/CEE-82008 ..... N83-10123 #
NSF/CEE-82010 ..... N83-10287 #
NSF/CEE-82011 ..... N83-10277 #

NSF/ECS-81014 ..... N83-10974 #

NSF/ISP-81028 ..... N83-10973 #

NSF/MEA-81021 ..... N83-10863 #
NSF/MEA-81022 ..... N83-10788 #

NSF/PRA-81019 ..... N83-10975 #

NSMRL-957 ..... N83-10776 #
NSMRL-960 ..... N83-10759 #
NSMRL-979 ..... N83-10769 #

NTIA-81-89 ..... N83-10343 #

NTSB-AAR-82-8 ..... N83-10022 #

NWS-AR-34 ..... N83-10736 #

ONWI-311 ..... N83-10702 #

OQR/81-4 ..... N83-10639 #

OR-16962 ..... N83-10361 #

ORNL-CSD-102 ..... N83-10827 #

ORNL-5813 ..... N83-10828 #
ORNL-5874 ..... N83-10968 #

ORNL/CSD-TM-173 ..... N83-10613 #

ORNL/CSD-93 ..... N83-10395 #
ORNL/CSD-96 ..... N83-10790 #

ORNL/CSD/TM-134 ..... N83-10824 #
ORNL/CSD/TM-171 ..... N83-10821 #

ORNL/TM-6844 ..... N83-10936 #
ORNL/TM-7658 ..... N83-10957 #
ORNL/TM-7871 ..... N83-10807 #
ORNL/TM-7969 ..... N83-10940 #
ORNL/TM-8062 ..... N83-10942 #
ORNL/TM-8180 ..... N83-10948 #
ORNL/TM-8200 ..... N83-10949 #
ORNL/TM-8211 ..... N83-10956 #
ORNL/TM-8282 ..... N83-10943 #
ORNL/TM-8321 ..... N83-10116 #
ORNL/TM-8353 ..... N83-10751 #
ORNL/TM-8393 ..... N83-10928 #
ORNL/TM-8416 ..... N83-10929 #

OTA-A-131 ..... N83-10994 #

OTA-STI-175 ..... N83-10033 #

PAPER-12.4 ..... N83-10102 #

PB81-187832 ..... N83-10415 #
PB82-105766 ..... N83-10200 #
PB82-174384 ..... N83-10375 #
PB82-175969 ..... N83-10744 #
PB82-176231 ..... N83-10671 #
PB82-176314 ..... N83-10402 #
PB82-177304 ..... N83-10159 #
PB82-177338 ..... N83-10493 #
PB82-177353 ..... N83-10191 #
PB82-177791 ..... N83-10492 #
PB82-177874 ..... N83-10670 #
PB82-177965 ..... N83-10158 #
PB82-177981 ..... N83-10416 #
PB82-178708 ..... N83-10748 #
PB82-179029 ..... N83-10401 #
PB82-180142 ..... N83-10297 #
PB82-180175 ..... N83-10669 #
PB82-180241 ..... N83-10668 #
PB82-180316 ..... N83-10667 #
PB82-180324 ..... N83-10302 #
PB82-180332 ..... N83-10296 #
PB82-181090 ..... N83-10642 #
PB82-181108 ..... N83-10672 #
PB82-181306 ..... N83-10746 #
PB82-181322 ..... N83-10303 #
PB82-181611 ..... N83-10301 #
PB82-181637 ..... N83-10666 #
PB82-181751 ..... N83-10731 #
PB82-181843 ..... N83-10757 #
PB82-182486 ..... N83-10800 #
PB82-182494 ..... N83-10801 #
PB82-182684 ..... N83-10300 #
PB82-182700 ..... N83-10792 #
PB82-182882 ..... N83-10747 #
PB82-182965 ..... N83-10799 #
PB82-183880 ..... N83-10665 #
PB82-183997 ..... N83-10643 #
PB82-184003 ..... N83-10640 #
PB82-184029 ..... N83-10774 #
PB82-184086 ..... N83-10641 #
PB82-184722 ..... N83-10654 #
PB82-184912 ..... N83-10276 #
PB82-185141 ..... N83-10490 #
PB82-185372 ..... N83-10489 #
PB82-185547 ..... N83-10844 #
PB82-185554 ..... N83-10798 #
PB82-185760 ..... N83-10488 #
PB82-185836 ..... N83-10182 #
PB82-185869 ..... N83-10181 #
PB82-187212 ..... N83-10299 #
PB82-187840 ..... N83-10414 #
PB82-187857 ..... N83-10413 #
PB82-188905 ..... N83-10864 #
PB82-189150 ..... N83-10454 #
PB82-189754 ..... N83-10745 #
PB82-190356 ..... N83-10491 #
PB82-191834 ..... N83-10709 #
PB82-192576 ..... N83-10342 #
PB82-192600 ..... N83-10973 #
PB82-192741 ..... N83-10977 #
PB82-192956 ..... N83-10304 #
PB82-193085 ..... N83-10485 #
PB82-193418 ..... N83-10341 #
PB82-193434 ..... N83-10189 #
PB82-193921 ..... N83-10484 #
PB82-194164 ..... N83-10180 #
PB82-194895 ..... N83-10187 #
PB82-194903 ..... N83-10188 #
PB82-194961 ..... N83-10430 #
PB82-195298 ..... N83-10732 #
PB82-196064 ..... N83-10733 #
PB82-196403 ..... N83-10153 #
PB82-196650 ..... N83-10455 #
PB82-196668 ..... N83-10734 #
PB82-196700 ..... N83-10400 #
PB82-197039 ..... N83-10089 #
PB82-197047 ..... N83-10090 #
PB82-197195 ..... N83-10412 #
PB82-197344 ..... N83-10373 #
PB82-198193 ..... N83-10125 #
PB82-199845 ..... N83-10411 #
PB82-200247 ..... N83-10673 #
PB82-200312 ..... N83-10480 #
PB82-200403 ..... N83-10838 #
PB82-200734 ..... N83-10149 #
PB82-200742 ..... N83-10148 #
PB82-200932 ..... N83-11008 #
PB82-200940 ..... N83-11009 #
PB82-201310 ..... N83-10155 #
PB82-201351 ..... N83-10186 #
PB82-201609 ..... N83-10293 #
PB82-201773 ..... N83-10663 #
PB82-202045 ..... N83-10486 #
PB82-202243 ..... N83-10190 #
PB82-202268 ..... N83-10185 #
PB82-202276 ..... N83-10708 #
PB82-202292 ..... N83-10723 #
PB82-202409 ..... N83-10993 #
PB82-202417 ..... N83-10987 #
PB82-202540 ..... N83-10788 #
PB82-202565 ..... N83-10124 #
PB82-202805 ..... N83-10721 #
PB82-202847 ..... N83-10487 #
PB82-202862 ..... N83-10994 #
PB82-202953 ..... N83-10282 #
PB82-202961 ..... N83-10283 #
PB82-203100 ..... N83-10974 #
PB82-203134 ..... N83-10722 #
PB82-203159 ..... N83-10706 #
PB82-203183 ..... N83-10292 #
PB82-203316 ..... N83-10986 #
PB82-203639 ..... N83-10294 #
PB82-203647 ..... N83-10154 #
PB82-203688 ..... N83-10836 #
PB82-203696 ..... N83-10837 #
PB82-204058 ..... N83-10720 #
PB82-204108 ..... N83-10787 #
PB82-204413 ..... N83-10976 #
PB82-204611 ..... N83-10724 #
PB82-205188 ..... N83-10843 #
PB82-205709 ..... N83-10376 #
PB82-205717 ..... N83-10655 #
PB82-206202 ..... N83-10192 #
PB82-206343 ..... N83-10307 #
PB82-206368 ..... N83-10152 #
PB82-206806 ..... N83-10183 #
PB82-206814 ..... N83-10203 #
PB82-207226 ..... N83-10992 #
PB82-207366 ..... N83-10638 #
PB82-207515 ..... N83-10199 #
PB82-207606 ..... N83-10033 #
PB82-208075 ..... N83-10306 #
PB82-208521 ..... N83-10038 #
PB82-208554 ..... N83-10202 #
PB82-208653 ..... N83-10773 #
PB82-208810 ..... N83-10305 #
PB82-209438 ..... N83-10184 #
PB82-209644 ..... N83-10789 #
PB82-209800 ..... N83-10975 #
PB82-211392 ..... N83-10372 #
PB82-211509 ..... N83-10660 #
PB82-212309 ..... N83-10295 #
PB82-212457 ..... N83-10291 #
PB82-212937 ..... N83-10863 #
PB82-213679 ..... N83-10274 #
PB82-213687 ..... N83-10281 #
PB82-213737 ..... N83-10214* #
PB82-214067 ..... N83-10374 #
PB82-214347 ..... N83-10156 #
PB82-214362 ..... N83-10756 #
PB82-214370 ..... N83-10204 #
PB82-214388 ..... N83-10157 #
PB82-215054 ..... N83-10639 #
PB82-215070 ..... N83-10711 #
PB82-215096 ..... N83-10743 #
PB82-215104 ..... N83-10727 #
PB82-215138 ..... N83-10707 #
PB82-215146 ..... N83-10636 #
PB82-215492 ..... N83-10726 #
PB82-215559 ..... N83-10147 #
PB82-215641 ..... N83-10710 #
PB82-215708 ..... N83-10725 #
PB82-215716 ..... N83-10741 #
PB82-215815 ..... N83-10742 #
PB82-215906 ..... N83-10343 #
PB82-216102 ..... N83-10837 #
PB82-216128 ..... N83-10150 #
PB82-216136 ..... N83-10755 #
PB82-216581 ..... N83-10730 #
PB82-217100 ..... N83-10659 #
PB82-217118 ..... N83-10658 #
PB82-217126 ..... N83-10657 #
PB82-217175 ..... N83-10775 #
PB82-217183 ..... N83-10284 #
PB82-217514 ..... N83-10290 #
PB82-217522 ..... N83-10729 #
PB82-217753 ..... N83-10634 #
PB82-217761 ..... N83-10635 #
PB82-217969 ..... N83-10289 #
PB82-218074 ..... N83-10280 #
PB82-218124 ..... N83-10201 #
PB82-218439 ..... N83-10286 #
PB82-218462 ..... N83-10656 #
PB82-218496 ..... N83-10278 #
PB82-218603 ..... N83-10123 #
PB82-218710 ..... N83-10344 #
PB82-218926 ..... N83-10287 #
PB82-219023 ..... N83-10728 #
PB82-219049 ..... N83-10740 #
PB82-220070 ..... N83-10661 #
PB82-220161 ..... N83-10277 #
PB82-220179 ..... N83-10279 #
PB82-220690 ..... N83-10653 #
PB82-220765 ..... N83-10482 #
PB82-220864 ..... N83-10483 #
PB82-221359 ..... N83-10481 #
PB82-221367 ..... N83-10909 #
PB82-224429 ..... N83-10288 #
PB82-224528 ..... N83-10712 #
PB82-227596 ..... N83-10285 #
PB82-227612 ..... N83-10161 #
PB82-227620 ..... N83-10429 #
PB82-227653 ..... N83-10213 #
PB82-227679 ..... N83-10160 #
PB82-230319 ..... N83-10662 #
PB82-284805 ..... N83-10664 #
PB82-289002 ..... N83-10298 #
PB82-916408 ..... N83-10022 #

PCM-P1-1982 ..... N83-10725 #

PFC/CP-82-2 ..... N83-10933 #
PFC/CP-82-4 ..... N83-10934 #

PFC/RR-82-1 ..... N83-10944 #
PFC/RR-82-2 ..... N83-10950 #
PFC/RR-82-6 ..... N83-10932 #
PFC/RR-82-9 ..... N83-10939 #

PNL-4208 ..... N83-10795 #
PNL-4257 ..... N83-10177 #
PNL-4282 ..... N83-10609 #

PPRP-57 ..... N83-10661 #
PPRP-58 ..... N83-10748 #

PR-20 ..... N83-10505* #

PRI-42 ..... N83-10941 #
PRI-43 ..... N83-10955 #

PRL/TN-80-05 ..... N83-10864 #

PUBL-SER-B-115 ..... N83-10563 #

PWA-FR-15323 ..... N83-10138 #

PWA-5723-27 ..... N83-10044* #

QR-6 ..... N83-10360 #

R-64.125 ..... N83-10620 #

RA-208 ..... N83-10313 #

RADC-TR-82-131-VOL-1 ..... N83-10112 #
RADC-TR-82-131-VOL-2 ..... N83-10111 #

RAE-STRUCT-BF/B/0893 ..... N83-10052 #

RAE-TM-AERO-1945 ..... N83-10390 #

RAE-TM-AERO-1949 ..... N83-10391 #

RAE-TR-82007 ..... N83-10052 #

RAG-K-330 ..... N83-10617 #

RAG-317 ..... N83-10428 #

REPT-R-405 ..... N83-10455 #

REPT-7 ..... N83-10788 #
REPT-41.0801.43.11 ..... N83-10623 #
REPT-80ASE142DR1-VOL-2 ..... N83-10991* #
REPT-82-SM-12 ..... N83-10450 #
REPT-280 ..... N83-10472* #
REPT-450-PT-2 ..... N83-11008 #
REPT-450-SUPPL ..... N83-11009 #
REPT-1982-ST-133 ..... N83-10340 #
REPT-2390J022 ..... N83-10305 #
REPT-8205-X4300-200 ..... N83-10927 #

RFP-3113 ..... N83-10141 #

RFQ-49-5808 ..... N83-10695 #

RHO-BW-SA-197-P ..... N83-10703 #

RL-82-014 ..... N83-10038 #
RL-82-015 ..... N83-10202 #

RR-132 ..... N83-10660 #
RR-179 ..... N83-10852 #
RR-180 ..... N83-10833 #
RR-181 ..... N83-10853 #
RR-182 ..... N83-10834 #
RR-183 ..... N83-10178 #
RR-184 ..... N83-10179 #
RR-186 ..... N83-10753 #
RR-187 ..... N83-10754 #

RV/1/81 ..... N83-10990 #

R82-36 ..... N83-10472* #
R82-915622-8 ..... N83-10018* #

SAI-254-82-134-LJ ..... N83-10941 #
SAI-254-82-173-LJ ..... N83-10955 #

SAND-80-1968 ..... N83-10896 #
SAND-81-0297 ..... N83-10826 #
SAND-81-0433 ..... N83-10409 #
SAND-81-0930 ..... N83-10396 #
SAND-81-1084C ..... N83-10889 #
SAND-81-1376 ..... N83-10825 #
SAND-81-1488 ..... N83-10476 #
SAND-81-1780 ..... N83-10599 #
SAND-81-1810/1 ..... N83-10696 #
SAND-81-1900 ..... N83-10818 #
SAND-81-1944 ..... N83-10855 #
SAND-81-2009 ..... N83-10894 #
SAND-81-2154 ..... N83-10890 #
SAND-81-2235 ..... N83-10857 #
SAND-81-2546 ..... N83-10088 #
SAND-81-7007 ..... N83-10597 #
SAND-81-7019/1 ..... N83-10605 #
SAND-81-7088/7 ..... N83-10607 #
SAND-81-7099/6 ..... N83-10608 #
SAND-81-7153 ..... N83-10695 #
SAND-82-0051 ..... N83-10820 #
SAND-82-0175 ..... N83-10817 #
SAND-82-0317 ..... N83-10858 #
SAND-82-0322 ..... N83-10982 #
SAND-82-0361 ..... N83-10841 #
SAND-82-0672 ..... N83-10603 #
SAND-82-0701 ..... N83-10598 #
SAND-82-0726 ..... N83-10814 #
SAND-82-0782 ..... N83-10854 #
SAND-82-0792 ..... N83-10816 #
SAND-82-0825 ..... N83-10197 #
SAND-82-0906 ..... N83-10878 #
SAND-82-0934 ..... N83-10610 #
SAND-82-1114 ..... N83-10772 #
SAND-82-1543 ..... N83-10793 #

SCEGIT-101-82 ..... N83-10708 #

SD-TR-82-2 ..... N83-10330 #

SE-30 ..... N83-10487 #

SERI/TP-215-1636 ..... N83-10364 #

SERI/TR-09172-2 ..... N83-10604 #
SERI/TR-11052-1 ..... N83-10601 #

SNIAS-822-320-101 ..... N83-10102 #

SRD-81-088 ..... N83-10349* #

SRI-05-5342 ..... N83-10289 #

SSL-22-82-VOL-2 ..... N83-10848* #
SSL-24-82-VOL-4 ..... N83-10849* #

STI-TR-1172-1R-REV ..... N83-10047* #

SU-45 ..... N83-10840* #

TAE-470 ..... N83-10803* #

TEI-A009-6 ..... N83-10360 #

TIEDONANTO-22 ..... N83-10976 #
TIEDONANTO-84 ..... N83-10183 #

TM-38 ..... N83-10863 #

TOP-6-3-120 ..... N83-10030 #

TR-D-53 ..... N83-10670 #

TR-EE-82-22 ..... N83-10358 #

TR-1 ..... N83-10329* #
TR-23 ..... N83-10139 #
TR-57 ..... N83-10450 #
TR-82-8 ..... N83-10687 #
TR-113-6 ..... N83-10809 #
TR-143 ..... N83-10712 #
TR-203-SER-2 ..... N83-10872 #
TR-205-SER-2 ..... N83-10871 #

TRANS-T5836 ..... N83-10127 #

TRB/NCHRP/SYN-81 ..... N83-10303 #

TRB/SR-194 ..... N83-10992 #

TRB/TRR-836 ..... N83-10295 #

TSC-W41-142/RAD ..... N83-10331 #

TVA/OACD-82/9 ..... N83-10613 #

UCB/EERC-81/19 ..... N83-10278 #
UCB/EERC-81/20 ..... N83-10279 #
UCB/EERC-82/01 ..... N83-10287 #
UCB/EERC-82/02 ..... N83-10277 #

UCID-19125 ..... N83-10699 #
UCID-19287 ..... N83-10823 #
UCID-19294 ..... N83-10794 #
UCID-19310 ..... N83-10822 #
UCID-19354 ..... N83-10815 #
UCID-19373 ..... N83-10851 #
UCID-19393 ..... N83-10984 #
UCID-19405 ..... N83-10477 #

UCRL-TRANS-11752 ..... N83-10363 #

UCRL-52000-82-3 ..... N83-11015 #
UCRL-53200-REV-1 ..... N83-10697 #
UCRL-53217 ..... N83-10693 #
UCRL-53230 ..... N83-10869 #
UCRL-53246 ..... N83-10700 #
UCRL-53255 ..... N83-10691 #
UCRL-53263 ..... N83-10819 #
UCRL-86890-REV-1 ..... N83-10879 #

UDR-TR-81-147 ..... N83-10810 #

UILU-ENG-81-4003 ..... N83-10500 #

UM-HSRI-81-42 ..... N83-10993 #

URI-MTR-77 ..... N83-10483 #

US-PATENT-APPL-SN-126063 ..... N83-10501*
US-PATENT-APPL-SN-130496 ..... N83-10417*
US-PATENT-APPL-SN-195228 ..... N83-10900*
US-PATENT-APPL-SN-210632 ..... N83-10170*
US-PATENT-APPL-SN-224231 ..... N83-10040*
US-PATENT-APPL-SN-246772 ..... N83-10494*
US-PATENT-APPL-SN-254575 ..... N83-10126*
US-PATENT-APPL-SN-264378 ..... N83-10117*
US-PATENT-APPL-SN-280154 ..... N83-10345*

US-PATENT-CLASS-29-458 ..... N83-10170*
US-PATENT-CLASS-29-521 ..... N83-10170*
US-PATENT-CLASS-55-204 ..... N83-10501*
US-PATENT-CLASS-73-170R N83-10040*
US-PATENT-CLASS-73-178R N83-10040*
US-PATENT-CLASS-204-56R N83-10494*
US-PATENT-CLASS-204-192E N83-10117*
US-PATENT-CLASS-204-299R N83-10126*
US-PATENT-CLASS-313-106 ..... N83-10117*
US-PATENT-CLASS-313-107 ..... N83-10117*
US-PATENT-CLASS-315-5.38 ..... N83-10117*
US-PATENT-CLASS-318-803 ..... N83-10345*
US-PATENT-CLASS-343-100ME N83-10040*
US-PATENT-CLASS-350-170 ..... N83-10900*
US-PATENT-CLASS-350-286 ..... N83-10900*
US-PATENT-CLASS-363-87 ..... N83-10345*
US-PATENT-CLASS-372-56 ..... N83-10417*
US-PATENT-CLASS-372-59 ..... N83-10417*
US-PATENT-CLASS-372-60 ..... N83-10417*
US-PATENT-CLASS-374-122 ..... N83-10040*
US-PATENT-CLASS-374-123 ..... N83-10040*
US-PATENT-CLASS-403-282 ..... N83-10170*
US-PATENT-CLASS-422-200 ..... N83-10501*
US-PATENT-CLASS-422-202 ..... N83-10501*
US-PATENT-CLASS-422-224 ..... N83-10501*

US-PATENT-4,343,772 ..... N83-10501*
US-PATENT-4,346,595 ..... N83-10040*
US-PATENT-4,347,613 ..... N83-10417*
US-PATENT-4,349,424 ..... N83-10117*
US-PATENT-4,349,429 ..... N83-10126*
US-PATENT-4,349,954 ..... N83-10170*
US-PATENT-4,350,410 ..... N83-10900*
US-PATENT-4,350,574 ..... N83-10494*
US-PATENT-4,351,022 ..... N83-10345*

USARIEM-M-30/82 ..... N83-10762 #
USARIEM-M-31/82 ..... N83-10780 #

USGS-GD-82-004 ..... N83-10480 #

USGS-OFR-82-401 ..... N83-10701 #
USGS-OFR-82-457 ..... N83-10690 #

USGS/WDR/CO-80-3-VOL-3 ..... N83-10486 #

USGS/WDR/OR-80-1 ..... N83-10491 #

USGS/WRD/HD-81-064-VOL-3 ..... N83-10486 #

USGS/WRD/WRI/82-006 ..... N83-10490 #
USGS/WRD/WRI/82-007 ..... N83-10488 #
USGS/WRD/WRI/82-026 ..... N83-10720 #

USGS/WRI-81-42 ..... N83-10158 #
USGS/WRI-81-49 ..... N83-10720 #
USGS/WRI-81-50 ..... N83-10490 #
USGS/WRI-81-82 ..... N83-10488 #

UTIAS-TN-232 ..... N83-10381 #

UTIAS-254 ..... N83-10026 #
UTIAS-256 ..... N83-10923 #
UTIAS-257 ..... N83-10273 #
UTIAS-261 ..... N83-10682 #

UW-CONTRIB-0000 ..... N83-10688 #

VETRC-82-R24 ..... N83-10293 #

VHTRC-82-R6 ..... N83-10125 #

VTH-LR-266 ..... N83-10053 #
VTH-LR-328 ..... N83-10398 #
VTH-LR-329 ..... N83-10399 #
VTH-LR-333 ..... N83-10452 #
VTH-LR-340 ..... N83-10453 #
VTH-LR-341 ..... N83-10122 #

VTT-RN-37-1981 ..... N83-10843 #

VTT-15/1981 ..... N83-10152 #

WFPS-TME-81-031 ..... N83-10947 #

W82-04963 ..... N83-10712 #

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983—381-564/301

PUBLIC COLLECTIONS OF NASA DOCUMENTS

DOMESTIC

NASA distributes its technical documents and bibliographic tools to eleven special libraries located in the organizations listed below. Each library is prepared to furnish the public such services as reference assistance, interlibrary loans, photocopy service, and assistance in obtaining copies of NASA documents for retention.

CALIFORNIA
University of California, Berkeley
COLORADO
University of Colorado, Boulder
DISTRICT OF COLUMBIA
Library of Congress
GEORGIA
Georgia Institute of Technology, Atlanta
ILLINOIS
The John Crerar Library, Chicago
MASSACHUSETTS
Massachusetts Institute of Technology, Cambridge
MISSOURI
Linda Hall Library, Kansas City
NEW YORK
Columbia University, New York
OKLAHOMA
University of Oklahoma, Bizzell Library
PENNSYLVANIA
Carnegie Library of Pittsburgh
WASHINGTON
University of Washington, Seattle

NASA publications (those indicated by an '*' following the accession number) are also received by the following public and free libraries:

CALIFORNIA
Los Angeles Public Library
San Diego Public Library
COLORADO
Denver Public Library
CONNECTICUT
Hartford Public Library
MARYLAND
Enoch Pratt Free Library, Baltimore
MASSACHUSETTS
Boston Public Library
MICHIGAN
Detroit Public Library
MINNESOTA
Minneapolis Public Library and Information Center
NEW JERSEY
Trenton Public Library
NEW YORK
Brooklyn Public Library
Buffalo and Erie County Public Library
Rochester Public Library
New York Public Library
OHIO
Akron Public Library
Cincinnati and Hamilton County Public Library
Cleveland Public Library
Dayton Public Library
Toledo and Lucas County Public Library
TEXAS
Dallas Public Library
Fort Worth Public Library
WASHINGTON
Seattle Public Library
WISCONSIN
Milwaukee Public Library

An extensive collection of NASA and NASA-sponsored documents and aerospace publications available to the public for reference purposes is maintained by the American Institute of Aeronautics and Astronautics, Technical Information Service, 555 West 57th Street, 12th Floor, New York, New York 10019.

EUROPEAN

An extensive collection of NASA and NASA-sponsored publications is maintained by the British Library Lending Division, Boston Spa, Wetherby, Yorkshire, England. By virtue of arrangements other than with NASA, the British Library Lending Division also has available many of the non-NASA publications cited in *STAR*. European requesters may purchase facsimile copy of microfiche of NASA and NASA-sponsored documents, those identified by both the symbols '#' and '*' from: ESA - Information Retrieval Service, European Space Agency, 8-10 rue Mario-Nikis, 75738 Paris CEDEX 15, France.

National Aeronautics and
Space Administration

Washington, D.C.
20546

Official Business
Penalty for Private Use, $300

SPECIAL FOURTH CLASS MAIL
Book

Postage and Fees Paid
National Aeronautics and
Space Administration
NASA-451

U.S.MA

8 1 STAR, 830112 S01733HU
UNIV OF MICHIGAN
GRADUATE LIBRARY
DOCUMENT UNIT SERIALS DIV
ANN HARBOR MI 48109

If Undeliverable (Sectio
Postal Manual) Do No